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ORIGINAL ARTICLES

LOSS OF CHLORIDE AND WATER FROM THE TISSUES AND BLOOD IN ACUTE HIGH INTESTINAL OBSTRUCTION

An Experimental Study on Dogs With Duodenal Obstruction*

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It is now a well known fact that in uncomplicated cases of high intestinal obstruction certain fundamental changes take place in the blood. These are:—

1. A fall in the chloride,
2. A rise in the non-protein nitrogen, and
3. An increase in the carbon dioxide content.

The fall in blood chloride was first described by MacCallum and his associates¹, the rise in non-protein nitrogen by Tileston and Comfort², and the increase in the carbon dioxide content of the blood by McCann³. These changes have since been corroborated in a large number of clinical and experimental investigations, among which may be cited the papers of Hastings, Murray and Murray⁴, Haden and Orr^{5,6,7}, Gamble and Ross⁸, and Hartmann and Smyth⁹.

Preceding all these blood chemical studies was the observation, made by Hartwell and Houget¹⁰ in 1912, that life in cases of acute obstruction could be prolonged by saline injections. They attributed this chiefly to the relief of dehydration by the water. This interesting clinical phenomenon was subsequently lost sight of until the work of MacCallum¹ and Haden and Orr⁵, who demonstrated that the above mentioned characteristic changes in the blood chemistry could be prevented, and again pointed out that life could be greatly prolonged by the administration of adequate amounts of isotonic salt solution. At the same time Haden and Orr showed that little could be accomplished by water alone or isotonic glucose. Unlike Hartwell and Houget, they attributed this life sparing property of salt solution, not to the water but to the chloride ion, believing that it enters the tissues to neutralize a hypothetical toxic substance^{6,7} formed by the protein decomposition products in the obstructed bowel.

On the other hand, we find that Gamble and Ross⁸ believe that death in uncomplicated cases

of high intestinal obstruction is primarily due to dehydration rather than to toxemia. They further differ from Haden and Orr in considering that it is the loss of sodium ion, rather than the lowered level of the blood chloride, which is of vital importance. They show that carbon dioxide, which is being constantly formed in the process of normal metabolism, can take the place of even extensive loss of chloride from the blood, thereby keeping the body electrolyte constant; but that, when sodium ion is lost, it is not nearly so effectively replaced, and the total electrolyte is correspondingly lowered with an accompanying loss of body water. Hartmann and Smyth⁹ also take exception to Haden and Orr's theory that most of the chloride enters the tissues to neutralize a hypothetical toxin arising in the obstructed intestine. These most recent contributors report a large series of observations on children with pyloric obstruction and agree with Gamble and Ross that the chloride is probably all lost in the vomitus, although they report no actual measurements on the amount of chloride eliminated.

All these writers, therefore, agree on one point—that salt solution can be of the greatest value in prolonging the life of individuals suffering from high intestinal obstruction—but, as to its physiological action, there still seems to be a wide variation of opinion. Because there has been so much speculation and because so little has been reported on the exact chloride changes in the tissues and on the relationship of the chloride and water lost in the vomitus to the changes observed throughout the body, it seemed to us important to determine whether there is a migration of chloride out of or into the tissues, and what proportion of the total body chloride and water is lost by vomiting and other channels of elimination. The measurement of the sodium lost, and alterations in its level in the body are of course equally important. We are confining the present communication entirely to the chloride and water changes, but hope to re-

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port on these other changes in a subsequent paper.

Experiments were, therefore, conducted on a series of eight large dogs, in which the duodenum was either ligated with a tape ligature or cut across and its ends inverted. This was always done at a uniform level, about 10 cm. below the pylorus. The operation was performed under ether anaesthesia and during it samples of skin, rectus muscle, and omental fat were removed for chloride analysis. Before operation and at regular intervals thereafter, blood samples were collected under oil in oxalate tubes from the leg veins and analysed for plasma chloride, non-protein nitrogen, and carbon dioxide content. The blood concentration was measured by a hematocrit reading and a determination of the specific gravity¹¹. The dog was kept in a metabolism cage, and all the urine and vomitus were analyzed together to obtain the total loss of chloride and water. At the same time an accurate account was kept of all water drunk or administered by other channels. When the dog appeared to be moribund, he was usually killed with ether or chloroform and an autopsy performed. In this way it could be ascertained whether obstruction was complete, whether any considerable quantity of gastric contents had escaped analysis, and whether there was peritonitis or any other complication. Samples of the internal organs were taken for chloride analysis. In the case of the skin, fat and muscles, the normal values had been previously determined from specimens taken at operation, but in the case of the other organs, they had to be derived from the average of analyses on normal dogs. These normal values were so constant that the probable error is slight. The chloride analyses on both the blood and the tissues were performed by the method of Van Slyke¹², and are calculated in terms of sodium chloride.

EXPERIMENTAL

Only four of the cases are reported in detail, as they are the most complete and show the characteristic changes when the dog is given:—

- (1) Water by mouth only.
- (2) Water by mouth plus water into the intestines below point of obstruction.
- (3) Water by mouth plus 3 per cent. glucose subcutaneously, or
- (4) Water by mouth plus 0.9 per cent. sodium chloride subcutaneously.

Experiment I.

The duodenum in a collie dog (23 kilos) was divided and its ends inverted. During the course of three days this dog lost 5.5 liters of urine and vomitus, which contained 24.8 grams of chloride, expressed as sodium chloride (Figure I). By far the greater part of the chloride was lost in the vomitus, as with increasing dehydration these obstructed animals rapidly become

anuric. Furthermore, if the blood chloride falls much below the normal level, the urine becomes chloride free. On the third day the dog was obviously moribund—he was panting rapidly, his limbs were held rather stiffly and there was a fine tremor in all the muscles with spasmodic contractions which were especially noticeable in the jaw. The rectal temperature was 105° F. Both because of the clinical appearance of the skin and the abrupt rise in the hematocrit, the animal seemed to be profoundly dehydrated. Chemical analysis revealed over a 50 per cent fall in the chloride content of the blood, and a corresponding depletion in all the individual tissues (Table I).

TABLE I

	At operation	1st day	2nd day	3rd day—moribund
Blood plasma chloride	730*	566	459	330
Skin chloride.....	395			229
Fat "	155			117
Muscle "	227			128
Heart "	260†			100
Liver "	270†			158
Spleen "	260†			176
Kidney "	400†			176
Brain "	276†			199
Hematocrit	43%	65%	70%	73%
Spec. gravity of blood	1.0666			
Non-protein nitrogen..	33	39	58	195
Plasma carbon dioxide	53.8%	53%	55%	65%

*In this and the subsequent tables the chlorides are expressed as mgs. of sodium chloride per 100 gms. of tissue.
†Determined in three normal dogs.

Experiment II.

In order to show that water, even if given so that it can be absorbed, does not prevent the characteristic blood changes or prolong life, an operation similar to the first was performed on a small collie (15.36 kilos). In addition, a catheter was stitched into the distal end of the divided duodenum and brought out through the abdominal wall. Water was allowed freely by mouth, but he drank practically none after the first day. Large amounts of water were also introduced through the catheter into the small intestine below the point of obstruction. A study of the graphs (Figure I) shows that this water was rapidly secreted into the stomach and vomited. This dog, also, was moribund at the end of the third day and appeared to be nearly as dehydrated as the first. He eliminated 11.8 grams of chloride, only half as much as the preceding dog. This apparent difference is lessened by the fact that in this experiment we had used a smaller animal. The fall of chloride in the blood and tissues were substantially the same in both animals (Table II). Autopsy revealed an early and very mild peritonitis, limited to a few coils of intestine in the right upper quadrant; it arose from a leaky stitch.

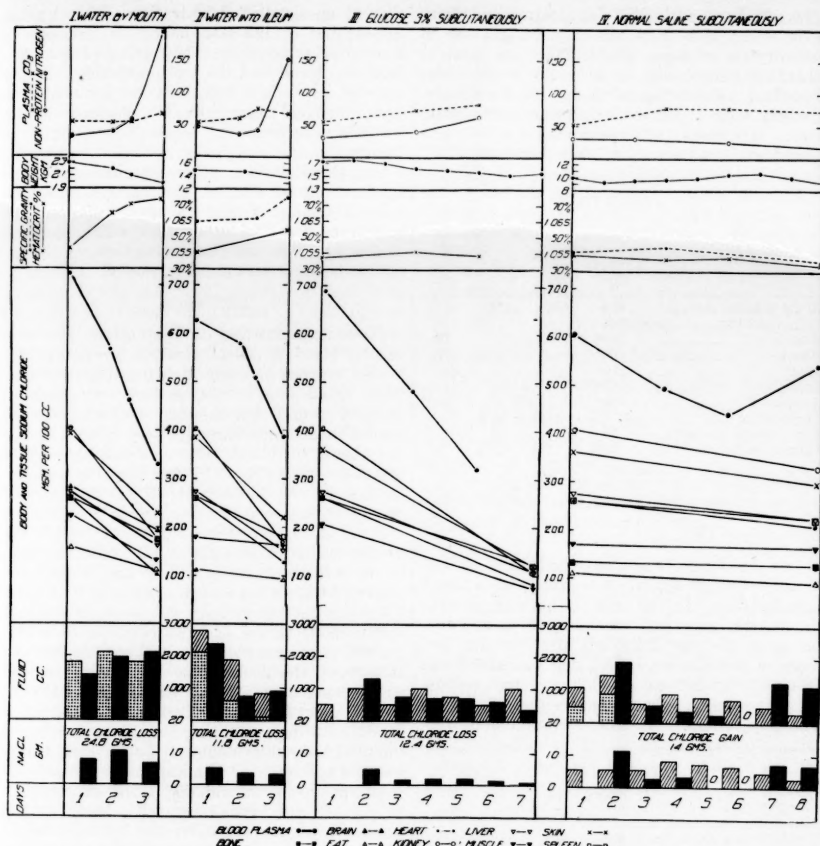


FIGURE 1

Solid black columns in bottom row represent sodium chloride loss in grams. Oblique lines indicate chloride intake. Solid black columns in row above represent total fluid output in centimeters. Stippled columns show fluid intake by mouth, oblique lines fluid administered by other channels.

TABLE II

	At operation	1st day	2nd day	3rd day—moribund
Blood plasma chloride	627	583	509	384
Skin chloride	385			222
Fat	112			94
Muscle	180			170
Heart	260*			95
Liver	270*			153
Spleen	270*			177
Kidney	400*			177
Hematocrit	40%			54%
Spec. gravity of blood	1.0644		1.0657	1.0722
Non-protein nitrogen	48	34	45	150
Plasma carbon dioxide	49.5%	58.4%	74%	65%

*Determined in three normal dogs.

Experiment III.

The operation of dividing the duodenum 10 cm. below the pylorus and inverting the cut ends was performed on a very fat mongrel dog weighing 17.3 kilos. He was allowed water freely by mouth, but drank none. From 500 to 1000 c.c. of 3 per cent glucose solution were injected daily into the subcutaneous tissues. This dog continued to secrete large quantities of urine (Figure 1) and did not appear to become markedly dehydrated; his hematocrit remained constant throughout. The specific gravity of the blood was, unfortunately, not determined. He died on the seventh day, having lived twice as long as the others. The glucose had apparently

prevented any noticeable dehydration and, coincident with this, there was only a slight rise in non-protein nitrogen (Table III). In spite of this, the animal did not seem to be otherwise benefited. From the third day on, he was extremely weak and eventually became semi-comatose. His blood and tissue chlorides fell to a lower level than in any of the other dogs.

TABLE III

	At operation	3rd day	5th day	7th day—post-mortem
Blood plasma chloride	688	483	320	147†
Skin chloride	360			120
Muscle "	200*			70
Heart "	260*			75
Liver "	270*			100
Spleen "	260*			115
Kidney "	400*			110
Hematocrit	37.5%	41%	39%	
Non-protein nitrogen	30	40	63	
Plasma carbon dioxide	52%	72%	83%	

*Determined in three normal dogs.

†Whole blood.

Experiment IV.

The duodenum was obstructed in a 10 kilo mongrel dog by ligating it tightly with a broad tape ligature. In the case of this dog, as with the others, measured amounts of water were placed in the cage daily, but after the first two days he drank none. The dog was also given from 600 to 900 c.c. of 0.9 per cent. sodium chloride solution subcutaneously every 24 hours. These injections were tolerated well and were

TABLE IV

	At operation	3rd day	5th day	8th day
Blood plasma chloride	695	485	440	540
Skin chloride	360			295
Fat "	110			92
Muscle "	167			160
Heart "	260*			210
Liver "	270*			221
Spleen "	260*			226
Kidney "	400*			329
Stomach "	400*			411
Bone "	132*			126
Hematocrit	40%	38%	39%	34%
Specific gravity	1.0551	1.0578		1.0530
Non-protein nitrogen	30	32	25	16
Plasma carbon dioxide	51.4%	79.5%	78%	71%

*Determined in three normal dogs.

completely absorbed. As a result, the animal remained for eight days in an apparently normal condition, in spite of the fact that he lost by vomitus and urine 31 grams of chloride, an amount, for his weight, from two to three times greater than that which proved fatal to the other dogs. During this period, he also continued to secrete normal amounts of urine and

showed no signs of dehydration, either by the appearance of his skin or by any change in hematocrit or blood specific gravity (Table IV). Both the blood and the tissue chlorides showed only a very slight fall. The experiment was terminated on the eighth day, because the injections were becoming increasingly painful to the dog.

Autopsy showed a normal peritoneum. The ligature had not slipped. The stomach contained a small amount of bile and mucus; its mucous membrane was slightly injected. The duodenal obstruction was potentially complete, as the intestine below it was entirely empty.

DISCUSSION

These experimental findings show the well known blood chemical changes previously reported in cases of acute high intestinal obstruction. In addition to this, we were very much interested to find that chloride was lost from the tissues in amounts directly proportional to the decrease in the blood. It is also possible to show by the graphs (Figure 1) that the total dechlorination of the blood and tissues corresponds closely to the amount of chloride actually recovered in the vomitus and urine. With the average value in the skin at 4.0 grams per kilo, in the muscles at 2.0 grams, in the internal organs at 2.6 grams, and in the bones at 1.3 grams, 2.5 grams per kilo of body weight ought to be an approximate figure for the total chloride, expressed as sodium chloride, in the whole dog. In this event, the 23 kilo dog in the first experiment would have started with a total salt content of about 58 grams. Losing 25 grams in the course of 3 days vomiting should have reduced the total body chloride nearly 50 per cent, which was the actual case. Similar mathematical calculations in the second and third experiments gave a salt elimination somewhat less than the predicted value. The difference between the estimated and the actual figures in the case of dog No. 3 is diminished when allowance is made for the extreme obesity. Fat contains very much less chloride than any other tissue and a very fat animal, therefore, would be expected to contain somewhat less than 2.5 grams per kilo.

We realize that it is unsafe to generalize on experimental results obtained from such a small series of dogs. The fall in tissue chloride, however, has been so constant and checks up so well with the actual amount of chloride recovered that we are publishing these observations as a preliminary report. We are now attempting to confirm these findings on human patients. If they are substantiated in a large series of cases, it will tend to overthrow the theory brought forward by Haden and Orr⁵. If the chloride radical combines with a hypothetical toxin in cases of high obstruction, there should be a retention of chloride in the tissues and a low excretion by vomiting, neither of which could be

demonstrated in these experiments. As further evidence to support their theory, the authors⁷ stated that the rabbit, an animal which is unable to vomit, develops a low blood chloride following an acute high obstruction. It was subsequently pointed out by Gamble and Melver¹³, who checked these findings with autopsies, that the obstructed rabbit develops an enormously dilated stomach which may contain three and a half times the amount of chloride found in the total plasma of the normal animal. These figures are in close agreement with ours.

In a recent article Haden and Orr¹⁴ have reported a series of observations on the chloride changes in the liver and muscle of dogs with pyloric and jejunal obstruction. Their figures are considerably lower than ours (normal liver averaging 1.44 grams of chloride, expressed as sodium chloride, and muscle 1.06 grams). They do show, however, a marked fall in the liver chloride and a lesser one in the muscle, but they do not suggest that this is contradictory to their theory that the chloride enters the tissues.

The findings in the experiments with our first two dogs are compatible with the theory of Gamble and Ross⁸—that death is due to dehydration consequent to the extensive loss of electrolyte from the body. This certainly is not the case in the dog treated with glucose, as he showed no signs of water loss, but died more completely dechlorinated than any of the others. Both this animal and the one in which a normal fluid level was maintained by subcutaneous injections of normal sodium chloride continued to secrete adequate amounts of urine. In contrast to the dehydrated and nearly anuric dogs in the first two experiments, the dog given glucose showed only a moderate rise in non-protein nitrogen and the one treated with sodium chloride exhibited a definite fall. It seems to us, therefore, that the rise in non-protein nitrogen is probably due to dehydration and inability of the kidneys to secrete nitrogenous waste products, as suggested by Gamble and Ross, rather than to a breakdown of tissue by an intestinal toxin, as proposed by Haden and Orr.

We are at a loss to explain the cause of death in the dog treated with glucose solution. No marked abnormality was apparent except the extremely low level of the chloride in the blood and tissues. It would be unjustifiable, however, to conclude that this alone can be the cause of death without much further research.

Finally, as to treatment, we agree absolutely with all the above mentioned investigators and wish merely to further emphasize the point that neither water nor isotonic glucose solution appear to be sufficient by themselves. In cases of acute high intestinal obstruction both sodium chloride and water are necessary to prevent a fatal alteration in the body chemistry.

CONCLUSIONS

In cases of duodenal obstruction:—

- (1) The fall of chloride in the tissues parallels that in the blood.
- (2) The loss of chloride from the blood and tissues corresponds with the total amount lost through all channels of elimination, and
- (3) Only the administration of both chloride and water can prevent a fatal alteration in the chemistry of the blood and tissues.

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APPENDICITIS. A REVIEW OF 3285 CASES*

BY HOWARD K. TUTTLE, M.D., F.A.C.S.

Forty years ago Reginald Fitz of Boston first demonstrated the true nature of acute perforative appendicitis. Methods of diagnosis and treatment have become perfected. Yet today it remains the most frequent of the grave abdominal diseases and has a per capita mortality rate of 14.5 per one hundred thousand. The Bureau of Vital Statistics shows an increase of 30.9 percent in deaths from appendicitis between the years 1900 and 1922.

*Read before the Medical Association of the Isthmian Canal Zone, June 15, 1926.

From 1904 to 1925 inclusive, 3568 patients have been admitted to Ancon Hospital with appendicitis. Two hundred and eighty declined operation, some of whom returned at a later date for operative treatment. Three patients died without operation, the cause of death being determined at necropsy. With the remaining 3285 cases this paper is chiefly concerned.

Admissions according to race were as follows: white, 2870; black, 411; yellow, 4. Appendicitis is not a common disease of the negro on the

Canal Zone, but when seen shows a high percentage of the suppurative and gangrenous types. Males outnumber females in the ratio of nearly three to one. The age incidence as shown under Table I reveals appendicitis as a disease of early adult life.

TABLE I

AGE INCIDENCE BY TEN-YEAR PERIODS

Ten-year periods	Percent of cases
From 0 to 9	2.2
" 10 " 19	11.6
" 20 " 29	49.
" 30 " 39	26.4
" 40 " 49	8.9
" 50 " 59	1.4
" 60 " 69	.5

Etiological factors of special interest include trauma, intestinal parasites, foreign bodies, and coexisting acute inflammations of distant tissues. The cases of traumatic origin were due to a teamster being run over by his wagon in one, and to a perforating gun shot wound of the appendix in the other. The presence of intestinal parasites was noted in 57 instances and included oxyuris, uncinaria, ameba histolytica, Trichocephalus dispar, and segments of Taenia saginata. The pathological findings in these appendices varied from no demonstrable lesions to those showing ulceration and suppuration. The true etiological significance cannot be determined although their presence is probably sufficient in some instances to cause symptoms. Coexisting acute inflammations included tonsillitis, otitis media, pharyngitis, and carbuncle with pyaemia. It is probable that organisms from distant foci conveyed through the blood stream may be a definite etiological factor.

The cardinal symptoms were present in most of the acute cases. The presence of diarrhoea in 4.5 percent of these cases is sufficient to warrant care in eliminating appendicitis on the strength of this symptom alone. Right lumbar pain may cause the condition to be confused with renal disease or perinephritic abscess.

Physical findings vary with the severity of the disease. Of special importance is the tired, anxious facial expression so often seen in cases of the suppurative or perforative types. Examination of an acute abdomen should be carried out in the gentlest manner as rupture of a suppurative or gangrenous appendix may easily result from rough palpation. With the exception of the temperature and pulse rate, it has been said that the leucocyte count is the least reliable of all findings in acute appendicitis. A careful study of these factors in the various types of the disease is shown under Table II.

Table II. Temperature, pulse rate, leucocyte, and polymuclear counts, expressed in terms of percentage.

Type of appendicitis	Temp.		Pulse		Leucocytes		Only	
	Below 100 F.	Above 100 F.	Below 100	Above 100	Below 10,000	Above 10,000	Below 75%	Above 75%
Acute catarrhal	92	73	40	27	33	53		
Suppurative and gangrenous, non-perforative	75	72	20	20	40	25		
Perforative with local peritonitis	44	51	8	14	75	25		
" with diffuse peritonitis	29	30	10	22	40	8		
Chronic			15	22	25	64		
Normal			15	24	21	63		

The various operative incisions used were as follows:

McBurney	2629
" with suprapubic stab for drainage	81
" with left iliac stab for drainage	29
" with right flank stab for drainage	8
" enlarged toward the right flank	19
Midline suprapubic	438
Low right rectus	107
Right inguinal herniorrhaphy	62
Ventral hernia repair	13
Upper abdominal	26

Drainage was employed in 493 cases. We believe that gauze drains have no place in abdominal surgery except to check hemorrhage.

Pathological reports were received from 88.3 percent of appendices removed and the following Table III is based on those findings.

TABLE III
CLINICAL TYPES

Types	Number of cases	Per cent
Acute catarrhal	1208	36.8
Suppurative or gangrenous, non-perforative	520	15.8
Suppurative or gangrenous, perforative:		
With local peritonitis	268	8.2
With diffuse peritonitis	190	3.
Chronic	943	28.7
Tuberculous	11	.3
Adenocarcinoma	3	.09
Benign tumor	1	.03
Normal	231	7.1

Diffuse peritonitis is used in preference to general peritonitis, it being the opinion of the writer that it is impossible to state with any degree of accuracy the extent of the condition as seen through an ordinary operation incision. The term general peritonitis is reserved for the pathologist.

Associated surgical conditions found at operation are shown under Table IV.

Postoperative treatment of the non-drainage cases through a McBurney incision is usually simple. The patient is encouraged to get up in a wheel chair as soon as he feels able and many times is walking by the fourth or fifth day.

Drainage cases with peritonitis localized to the right side of the lower abdomen are turned on the right side or placed in the Fowler position. If unable to retain water by mouth, fluids are given rectally by retention enemata or drip. Morphine is used in sufficient quantity to prevent restlessness. Food by mouth is withheld until intestinal peristalsis is reestablished. Cathartics are not given until the patient is conval-

TABLE IV
ASSOCIATED CONDITIONS FOUND AT OPERATION

Conditions	Number of cases
Female pelvic.....	287
Lane's kink and Jackson's membrane.....	256
Right inguinal hernia.....	62
Cholelithiasis and and cholecystitis.....	37
Ventral hernia.....	13
Gastric and duodenal ulcers.....	5
Intestinal obstruction.....	5
Renal.....	5
Tuberculous peritonitis.....	3
Carcinoma of cecum.....	1
Carcinoma of sigmoid.....	1
Intestinal perforation, gun shot wound.....	1
Typhoid perforation.....	1
Strangulated appendix epiploica.....	1
Acute diverticulitis.....	1

escent. Enemata, pituitrin, and the rectal tube are used for distention.

The postoperative treatment of diffuse peritonitis requires the surgeon's best judgment.

TABLE V
POSTOPERATIVE COMPLICATIONS

Conditions	Number of cases
Acute retention of urine requiring catheterization.....	403
Wound infection.....	51
Malaria.....	37
Pneumonia.....	28
Wound hematoma.....	21
Pelvic abscess.....	18
Fecal fistula.....	12
Purulent bronchitis.....	11
Acute cystitis.....	7
Persistent sinus.....	6
Secondary intra-abdominal hemorrhage.....	6
Phlebitis.....	5
Pyelitis.....	5
Subdiaphragmatic abscess.....	4
Ileus.....	4
Acute dilatation of stomach.....	3
Liver abscess, non-amebic.....	3
Acidosis.....	3
Pulmonary infarct.....	3
Extensive subcutaneous fat necrosis.....	2
Lung abscess.....	2
Acute nephritis.....	2
Acute parotitis.....	2
Intestinal obstruction.....	2
Delirium tremens.....	2
Intra-intestinal hemorrhage.....	1
Pleurisy with effusion.....	1
Perinephritic abscess.....	1
Anuria.....	1

Here the high Fowler position, the liberal use of morphine, saline, glucose or soda bicarbonate solutions, used subcutaneously, intravenously, or rectally, are especially indicated. In this type of case stimulation with drugs is frequently needed. Fortunately in most cases the battle is won or lost in the first few days. A prolonged sepsis is a difficult and discouraging condition to treat.

The postoperative complications as seen in this series are shown under Table V.

In the earlier years of this series bladder catheterization was frequently necessary. By using benzol benzoate and allowing the patient to stand beside his bed this troublesome feature has been practically eliminated. Of the 403 patients requiring catheterization only 7 developed cystitis and 5 pyelitis. Practically all patients catheterized were given urotropin. The average number of postoperative febrile days and the total hospital days are shown under Table VI. The condition of patients on discharge from the hospital was as follows: Well, 3204; Improved, 22; Not improved, 2; Died, 56.

TABLE VI
AVERAGE POSTOPERATIVE FEBRILE DAYS AND TOTAL HOSPITAL DAYS BY CLINICAL TYPES

Types	Post-operative fever days	Hospital days
Acute catarrhal.....	1.2	15.5
Suppurative or gangrenous, non-perforative.....	1.5	13.5
Perforative, with local peritonitis.....	4.2	31.2
Perforative, with diffuse peritonitis.....	6.4	41.

Barring accidents and unforeseen complications there should be no surgical deaths in the acute catarrhal and chronic types. With the suppurative and gangrenous non-perforated type fatalities creep in; an occasional rupture of a pus appendix during removal or a beginning peritonitis overlooked and left undrained are the usual causes. While an appendix may not show gross perforation, it may become so spongy and porous that bacteria leak through the walls long before actual perforation takes place. The custom of draining such cases has gradually become less, depending on the peritoneum to take care of a limited amount of infection. We feel safer by leaving a small rubber tissue drain down to the appendix stump whenever there is evidence of peritoneal involvement. This drain can be removed in two days and if the peritoneum has escaped infection the wound will heal by primary union with no delay added to the convalescence. The mortality of this group should not exceed one percent.

Perforative appendicitis with localized peritonitis brings a sharp rise in the mortality rate. The first question that confronts us is how well

is the process localized. This varies from the appendix abscess of several days or more duration with adhesions completely separating it from the general peritoneal cavity, and with little systemic reaction, to those instances where nature, while making an attempt to confine the infection to the lower right abdomen, is slowly but surely waging a losing battle in the face of a virulent spreading infection.

Shall we operate in the presence of a spreading infection? Two of the greatest surgeons of

demanded drainage, he was brought to the dining-room table and his abscess drained. To have taken him down the trail at the onset would probably have killed him. As it was, he also made a good recovery.

TABLE VIII
CAUSES OF DEATH*

Appendicitis with immediate complications, 44	
Diffuse peritonitis.....	36
Septicopyaemia.....	8
Appendicitis with remote complications, 2	
Chronic nephritis.....	1
Acidosis.....	1
Deaths due to other causes, 10	
Gun shot wound of abdomen, diffuse peritonitis	1
Amebic dysentery.....	1
Typhoid fever.....	1
Acute pelvic inflammation, cholelithiasis, embolism.....	1
Fibroid of uterus, intestinal obstruction.....	1
Cholecystitis, diffuse peritonitis.....	1
Retroversion of uterus, intestinal obstruction.....	1
Acute pelvic inflammation, secondary hemorrhage.....	1
Carcinoma of cecum.....	1
Carcinoma of ovary, intestinal obstruction.....	1

*Necropsies, 22.

Table VII. Mortality rate by clinical types

Types	Total cases	Total deaths	Corrected deaths	Percent
Acute catarrhal	1006	6	2	0.2
Suppurative or purulent, non-perforative	520	3	2	0.4
Perforative, with local peritonitis	268	19	16	6.7
" " diffuse "	100	24	24	24.
Chronic	942	4	0	0.
Tuberculous	11	0	0	0.
Ascocarcinoma	3	0	0	0.
Benign tumor	1	0	0	0.
Normal	133	0	0	0.
Total	2286	56	42	1.8

* See deaths from other causes, Table VIII.

our time have differed widely on this point. John B. Murphy said that procrastination killed more patients than surgery, and always advised operation if obliged to in what he termed the second stage of the disease. To Murphy more than any other surgeon we owe the present treatment of peritonitis. Oschner, on the contrary, believed that by withholding all food and fluid by mouth, setting the patient up in bed, the liberal use of morphine and the giving of fluids by rectum, a large percent of these cases of spreading peritonitis would become localized and the patient could be operated upon at a later date with much less danger. During the period covered by this review many instances of both methods are noted with apparently little difference in the result. The Oschner method was used more often during the first ten years covered by the study. During the last decade it has become the policy more and more to go in at the earliest opportunity.

We know that both Murphy and Oschner were right. As an illustration, this was forcibly impressed on my mind while doing surgery in a South American mining camp. A boy next door developed a suppurative appendicitis with rapid perforation and spreading peritonitis. He was operated upon the next morning on the dining-room table and made an uneventful recovery. Another boy, four miles up the mountain, developed a similar attack and we carefully watched a large appendix abscess develop. When this had become well walled off, but absorption

Should the appendix always be removed in this type of case? Many advise removal whenever possible. This advice, if interpreted too literally will frequently result in disaster. It is always possible to remove the appendix, sometimes, however, at the expense of the patient's life.

It is our custom to approach these cases through an incision close to the anterior superior spine and Poupart's ligament. If the appendix is readily visualized it is removed. Excessive hemorrhage from the separation of adhesions usually means too much messing around. Better by far establish efficient drainage and remove the appendix at some later date. In this series the appendix was not removed in 46 cases. We believe the McBurney incision to be especially adapted for these cases with localized peritonitis. Many times the cecum can be lifted up, the appendix removed, and drainage placed along the posterior and lateral parietal peritoneum without the small intestine being seen. When we expose the small intestine we are liable to start a diffuse peritonitis. We condemn the practice of packing off the peritoneal cavity with gauze. Pus under pressure will go the way of least resistance, which is naturally through the incision. Moist gauze leaves its imprint on the serosa of the intestines with resulting devitalization. The infection present cannot help but produce adhesions with possible intestinal obstruction. By working on the outer side of the infection and respecting nature's barriers we will have little cause to worry about that portion of the peritoneum remaining uninfected. The mor-

is responsible. This may be the patient, the parents, the attending physician, or the surgeon. Purgatives and morphine are still too frequently used when the patient should be on the operating table. We believe these cases should be given that chance of recovery which immediate operation frequently achieves in apparently hopeless cases. The operation may be only simple drainage under local anaesthesia. Certain cases of this type are doomed from the time of perforation. Experience has shown that cases with the abdomen full of pus are much more likely to recover than those with the abdomen full of dry, red, swollen intestines. John B. Deaver, in his book on "Appendicitis," published in 1905, says: "Of the diffuse forms of peritonitis, those attended by the formation of pus, although extremely virulent and producing marked toxæmia, are less virulent and give rise to a less degree of toxæmia than do the hemorrhagic forms and those marked by the absence of exudate. The latter which may be designated toxic peritonitis is accompanied by so extreme a degree of toxæmia that the patient generally succumbs very quickly."

It is the policy here to open the abdomen first through a McBurney incision, remove the appendix if possible with safety, pass a finger under the abdominal wall and make a suprapubic stab wound. If further drainage is thought necessary the finger is passed through the supra-

Year	Number cases	Deaths	Corrected death	Percent
1904	3	0	0	0
1905	17	0	0	0
1906	29	3	3	10.3
1907	34	1	1	2.9
1908	59	1	1	1.7
1909	89	3	3	3.4
1910	168	2	1	0.6
1911	160	3	3	1.9
1912	187	6	5	1.6
1913	374	5	3	0.8
1914	265	4	2	0.7
1915	183	2	2	1.1
1916	155	1	1	0.7
1917	150	1	1	0.7
1918	168	3	3	1.6
1919	123	3	3	2.4
1920	176	4	3	1.7
1921	184	2	2	1.1
1922	180	3	3	1.7
1923	167	3	2	1.2
1924	186	3	3	1.6
1925	209	3	3	1.4

Diffuse peritonitis due to perforative appendicitis is one of the gravest conditions of abdominal surgery. In practically every case some one

[illegible]

pubic wound and another stab wound made over the left iliac fossa. Rubber tubes are inserted to the pelvis and the patient placed in a high Fowler position.

A total of 1010 cases or 31 percent of the entire series have been traced by subsequent admissions or correspondence. Of these, 840 were readmitted for conditions having no relationship to the previous appendicitis or its operation. The remaining 270 cases were made the subject of special study as to the cause of readmission, the previous type of appendicitis, and the operation, whether through a McBurney incision or one of the exploratory type. This was done to ascertain the possible errors in diagnosis and the associated pathological conditions overlooked at operation due to insufficient exploration. All suppurative types of the previous appendicitis are grouped together as we believe it to be extremely dangerous and unsurgical to explore the abdomen in the presence of a localized suppurative process. There is no doubt that the McBurney incision fails to give sufficient exposure for general exploration of the abdomen. The same applies to the Battle-Kammerer incision so popular in many clinics. This latter, however, has the advantage of extension in either direction in case of necessity. Our conclusions derived from the study of these return cases are as follows:

Frank cases of appendicitis of all types are best treated through a McBurney incision. Those obscure cases, either acute or chronic, in which an accurate diagnosis is impossible should have the benefit of exploration through a right

rectus incision that will permit visualization of the pylorus, gall bladder and appendix. In the female unless pelvic conditions can be absolutely eliminated the low midline incision furnishes the best approach.

The return of numerous chronic cases with symptoms unrelieved we attribute to hasty operation without sufficient study of other intra- and extra-abdominal conditions that may cause much the same symptomatology. Many of these cases are better treated medically.

Acute intestinal obstruction was a relatively rare sequela in this series and was noted almost entirely in clean cases. Postoperative adhesions were also most frequently seen in cases not previously drained.

While not an uncommon condition following a McBurney incision, we believe an oblique inguinal hernia to be due to congenital defect and of so common occurrence that appendectomy as an etiological factor may be disregarded.

Renal conditions may at times closely simulate acute appendicitis. It is better to occasionally remove an innocent appendix than to allow one to perforate while waiting for a more complete diagnosis.

By educating the public and the general practitioner as to the frequency of appendicitis, its gravity if not recognized early, the disastrous results caused by the use of purgatives and morphine, and the relatively slight danger of early operation, we may hope to decrease the mortality rate of this disease which even today approaches ten per cent in some localities.

"BACKACHE IN WOMEN"*†

From the Standpoint of the Gynecologist

BY A. K. PAINE, M.D., F.A.C.S.

Low backache is a complaint which brings many patients to the gynecologist. The conviction seems deeply rooted in the minds of the laity that "backache" and "womb trouble" are synonymous; with it is a companion conviction, that low abdominal pain means "ovary trouble." Statistically we find that backache leads as a predominant symptom which results in a visit to the gynecologist; it is such a predominant symptom in eighteen per cent of the cases. Discharge is second, accounting for fifteen per cent; low abdominal pain third, eleven per cent; and excessive flowing fourth, ten per cent. Practically, then, one patient in five visits the gynecologist because of backache.

Physicians have long since recognized that there are other explanations of low backache than derangements of the pelvic organs; the im-

portance of the latter is, however, still emphasized. An attempt to ascertain the part pelvic derangements, disorders and disease, play in producing this symptom, backache, must obviously go beyond a mere statement of the symptom on the one hand and the demonstration of some pelvic abnormality on the other. At least it must be shown that the symptom fairly constantly appears in the presence of certain definite pathology in the pelvis, to disappear when that pathology is corrected.

It is, of course, an unusual pelvis in which some variation from the accepted normal cannot be found, especially is this true after childbirth.

Consider some of these variations from normal; begin with that which has been blamed perhaps more than any other pelvic condition for backache, the retro-displacement. To the lay mind a "tipped womb" always means a backache, but observation discloses a large num-

*Read before the Berkshire (North) Medical Society, February 8, 1927.

†From the Department of Diseases of Women, Boston Dispensary.

ber of backward displacements without this symptom. It becomes necessary to explain why backache is present in only certain cases of retro-displacement. Something beyond the mere fact of displacement must be operative in such cases. A theory has been advanced that circulatory disturbances, in the broad ligaments perhaps, or the uterus itself, accompany the abnormal position and that it is this circulatory disturbance which causes the backache. This reasoning may be correct, but it is noted that back pain is not consistently existent in the pelvic inflammations; obviously in these cases the circulatory disturbances are marked. Twenty-five years ago "the utero-sacral ligaments" entered the picture frequently, but today one hardly hears them mentioned.

Pressure is the basis of another explanation. The adherent retroversion with pathology in the appendages might seem to be one which would most likely produce this pressure, but as noted, backache is not a common symptom of pelvic inflammation.

Besides the comparatively easily demonstrated backward displacement as explanatory of backache, the forward displacement has been in-eliminated; the mechanism being a little uncertain, the circulatory disturbance theory has again been advanced to explain how backache is produced by this comparatively slight variation from that which is considered a normal position. If, for instance, one considers the excursion of the fundus during the filling and emptying of the bladder, one cannot but realize that the uterus is not a fixed organ, (especially the fundal portion) and that a slight change in its position could hardly be productive of much circulatory disturbance or many symptoms. One can but remember the extreme degrees of prolapse one encounters, where the complaints are limited to the fact that "it comes outside" to realize that mere excursion of the uterus from its normal position is not, in itself, always sufficient to produce the symptom under discussion.

Cervicitis was formerly considered to be a frequent cause of backache. A large number of patients having backache have had children with the usual cervix injuries; on the other hand, many cases of cervicitis are encountered without backache and especially is this true of the pelvic inflammatory cases in which neither the marked pelvic morbidity nor the ever-present cervicitis seems particularly associated with backache.

The incarcerated pregnant fundus may appear with a backache as its first indication, as is the case with a non-incarcerated fundus threatening miscarriage. The symptom is obviously primarily that of miscarriage and not of position of the fundus.

It becomes increasingly apparent, as one considers the great variety of deviations from nor-

mal in the pelvis which may or may not be associated with backache, that it is not a consistent sign of any particular pathology. It may be a symptom of backward displacement of the uterus, but figures seem to prove that most commonly it is not. In the backache cases an accompanying retro-displacement was disclosed in but eleven per cent. Practically then a retro-displacement will be found in only one of ten backache cases.

The developmental deficiency pelvis with its frequently associated antelexions and versions, described as productive of backache, certainly seeks medical assistance more frequently for discharge, dysmenorrhea, and sterility than for the relief of backache.

Certain dysmenorrheas complain of an accompanying backache, representing perhaps the only group in which it seems consistently associated with definite gynecological conditions.

One can assume that any pelvic derangement, disorder or disease, may cause backache in certain cases even though the mechanism of its accomplishment is difficult to determine or explain. As a matter of academic discussion the theory is interesting. Unfortunately many patients seek assistance for this symptom and the easy assumption that a demonstrable pelvic abnormality is in itself sufficient explanation, leads, as a next step, to treatment, especially surgical treatment. Unfortunately again it is common experience that such treatment is not always justified by results.

With the realization, then, that backache may be present in one patient with certain pelvic abnormalities, and absent in another with more or less identical pathology, it becomes apparent that more light is required on the subject, before the part the pelvis plays in the production of this symptom can be accurately appraised.

Let us approach it from another angle and consider the symptom itself, discarding theory and devoting our attention to the simple observation of these backache cases.

Commonly they are of long duration, measured in months and years. In the greater number of cases the symptom is worse after exertion, especially toward night, with relief after lying down. A much smaller but very definite group has backache only when in bed. A backache persisting both day and night in equal intensity is infrequent. Another small group has backache when first getting up in the morning, still another is more uncomfortable when sitting any length of time. One is struck by the frequency with which these patients date their disability back to the birth of a child.

Patients who describe a backache after exertion also frequently complain of low abdominal discomfort or pain, in one lateral quadrant or the other, sometimes sharp and fleeting, sometimes dull and persistent. They have usually had these pains for a long time and they also

usually disappear when the patient lies down. Flatulency is a common accompanying complaint. Vomiting is infrequent—they have rarely been confined to bed with an acute attack of either abdominal pain or backache (excepting always time devoted to surgery—for "chronic appendicitis," or for the suspension operation so many have had). They have "hollow backs" (i. e. well marked anterior lumbar curves) and there is usually definite relaxation of the abdominal walls; they often are "round shouldered," apt to be under nourished, and they generally convey the impression that the business of living is almost beyond their capability. On the other hand the patients whose backaches are worse, or only, at night, present an entirely different picture. They are apt to be overweight, short and thickest. They have no lumbar curves, a flat square back with markedly restricted motions in all directions, a restriction obviously anatomical.

As these groups of backache patients in numbers file before the gynecologist, though his judgment may be warped by a predilection for his speciality, he cannot help but realize that this symptom in the great majority of cases has much to do with motion, position and posture. The largest group has no hesitancy in saying that in bed it has complete relief from this distressing symptom. Certain motions, bending, lifting, sweeping, aggravate the pain. With the character of the complaint is to be noted a fairly definite structural type of individual.

The gynecologist notes also that the great majority of these backache cases do housework, not perhaps in itself conclusive for the majority of women still do housework; he shares the common knowledge that factory efficiency has not yet been introduced into the kitchen, that there one hears nothing of "fatigue" and "faulty position," of "muscle strain" or of "wasted motion," though he has seen the faint beginnings of attention to this in the "yard-high sink" of advertisements.

To put it another way: the gynecologist finds himself confronted by the functional postural defects, in a broad use of that term. He may then retire gracefully in favor of the orthopedist, or he may indulge his curiosity and justify it by the argument that a given case, with some pelvic abnormality on the one hand, and a common postural defect on the other, is as much his responsibility as the orthopedist's. A decision is to be made as to where one begins and the other leaves off, in the production of this backache.

The gross anatomical back defects, the backs with definite pathology, do not often appear in this group. They have long since come under the care of the orthopedist and the acute back is rarely encountered by the gynecologist. Occasionally the gynecologist finds a chronic back pain dated to some accident or injury suppos-

edly causing uterine displacement; curiously this particular type is almost invariably an industrial or medicolegal case. In a general way, the cases as the gynecologist sees them are patients with comparatively slight deviations from normal, posturally; they have a maximum of discomfort with a minimum of pathology.

The study of backs from the limited standpoint of simple postural defects, discloses little that is complicated or obscure. They fall easily in two groups—the flexible backs, with exaggerated anterior lumbar curves and a tendency to round shoulders. These backs develop lateral flexions easily, the patient standing in her usual or most comfortable attitude. When such a case is requested to stand perfectly erect, the spinous processes will be noted in line, the shoulders are level, and muscle tension is equal on either side; but when she is requested to stand "comfortably," or as "she usually stands," a position she assumes easily and naturally, the weight will be borne on one foot, the lumbar curve increases, the abdomen becomes more prominent, the chest flattens, the round shoulders reappear, one often elevated and slightly anterior, and a lateral curve appears in the back, single or double, as the case may be. There is muscle spasm in the lumbar region, pronounced on one side, the muscles often tender to palpation. One can now see plainly the mechanism of a backache, and in the associated ptosed abdomen is to be found an explanation of vague but none the less persistent complaints. It is this abdomen which furnishes a large number of "chronic appendices," clinically meaning a pain in the right lower quadrant which has its chief characteristic, chronicity, and the fact of never an acute abdomen. It is this same abdomen which sends many patients to the gynecologist with a self-achieved diagnosis of "ovary trouble."

Palpation of this abdomen shows the characteristic relaxation, a palpable, distended, and sometimes tender caecum, usually at the pelvic brim; an easily palpable sigmoid, also usually tender; frequently a palpable liver edge and occasionally the "floating" kidney.

If an appendix operation has already been done, one may be surprised at the insistence with which the patient discusses "post operative adhesions." It seems that this is a sort of "defense mechanism." She seeks a legitimate justification for her continued symptoms, lest she find herself catalogued as a "neurotic."

As has already been indicated, the beginning of symptoms for many of the patients dates back to child-bearing. It is easy for them to think that their troubles are the direct effects of child-bearing. The lacerated cervix, cervicitis, discharge sequence, is to them additional evidence of the correctness of this line of reasoning and these patients furnish a fertile field for those operators who promise relief with a

cervix repair or a suspension. Granting that such may be the answer in a small group of cases, it is still easy to appreciate another sequence of events in the case that is essentially a postural fault.

Pregnancy brings abdominal relaxation, and back strain from weight bearing change; labor is a severe tax on physical strength, and a period in bed makes for acute muscular weakness. From this the patient gets up to greater exertion than she formerly knew. The mere fact of a baby means longer hours on her feet, broken rest, more lifting and more housework. The physically perfect, the structurally correct, and the favored of fortune may successfully negotiate this particular grade; the less favored rarely do, and of all the complaints which bring these unfortunates to the physician, backache ranks first, accompanied frequently by the indefinite, but none the less insistent, low abdominal symptoms.

This latter group of symptoms furnishes in itself an opportunity for considerable thought: a pain in the right side, in the left side, now sharp and fleeting, now dull and steady, discomfort, "pressure," "burning," gas, vague digestive disturbances, soreness, distension, the list is unending. Of course any or all of these may be indicative of true pathology. When such symptoms are accompanied by extreme degrees of relaxation, diathesis, and ponderous pendulous abdomens, there is little left to the imagination as to cause and effect, thanks to the work of Glennard and his followers. But as is the case with the lesser degrees of back postural faults, it is the less marked type of abdominal prolapse, often overlooked, which furnishes the important group in numbers and in sum total of abdominal discomfort. Most of the symptoms center in the low abdomen. This fact leads naturally to a pelvic search for the explanation. Loose reasoning may connect some variation from normal found with the symptom described; the retro-displacement again occupies a conspicuous place in etiological explanation. What has been said explicative of backache is equally applicable to these abdominal symptoms. One is unable to demonstrate a consistent relation between any of the symptoms enumerated and the pelvic pathology disclosed, and one must be exceedingly cautious in promising relief by pelvic surgery. Of course one may discover conditions which in themselves necessitate treatment, operative or otherwise.

There are cervixes to be repaired, as a treatment perhaps of one "child sterility," or to remove an invitation for subsequent malignant degeneration. In this regard, a word of caution: it is statistically capable of demonstration that the marked cervicitis, attributed to an associated laceration, is in reality due to Nessler infection in a large number of cases. Before cervix repairs and curettages, or other operative

procedures to cure cervicitis are undertaken, one should secure repeated negative smears. Pelvic floor repairs will always have to be done to preserve the geographical integrity of the pelvic contents.

The inflammations in the tubes and ovaries have long enjoyed a conspicuous place as explanatory of lateral quadrant pain. With the comparatively infrequent tubercular process and certain types of puerperal inflammation left out, inflammation of tubes and ovaries is pathologically a part of the so-called pelvic inflammation. This is another way, in by far the great majority of cases, of saying a gonorrheal pelvis. The observation of some twenty-five hundred or more of these cases has shown that pain, except during the acute stages of pelvic invasion is complained of rarely. A process sufficiently active to cause consistent pain is almost always associated with some (slight perhaps) temperature elevation. The chronic type of low abdominal morbidity under discussion is not of necessity an attribute of these pelvic inflammatory cases. An exception is to be noted: in the "third stage" of the pelvic inflammatory manifestations, i. e., the stage of degeneration, subsequent to the long drawn out inflammatory process, the effects of protracted morbidity plus vasomotor disturbances associated with ovarian degenerative changes result in a multiplicity of complaints. These suggest nervous instability in large part, but included is more or less persistent low abdominal pain.

Consider the anatomical arrangement of the abdomen, its possessor in the erect position. One hesitates to incur the wrath of the fundamentalists, but a most casual observation indicates either that nature completely disregarded the principles of applied mechanics when she arranged the position of the abdominal contents or else she did not intend man (or woman) to walk in the upright position. Presumably a remote ancestor assumed this position without nature's consent; his descendants pay a considerable price in physical infirmity for the achievement.

It requires no imagination to realize that the diaphragm was originally intended to be the floor of the abdominal cavity; it is perfectly constructed for this purpose, its openings are reduced to a minimum and these are cunningly reinforced; next it, on the floor, as sensible construction would arrange, the liver, the largest, the heaviest organ, the spleen and the kidneys in turn, the light loops of intestines freely movable in the space above. What we know as the "pelvic floor" is anything but an adequate floor; although it would make a reasonably satisfactory roof. The uterus suspended by its smaller end, would maintain, by the simple force of gravity, its normal relationship. With the assumption of the erect position the diaphragm becomes the roof and suspended to it by

delicate folds of peritoneum is the heavy liver. The disinclination of stomach, colon and kidneys to stay up where they belong has long been recognized. The inadequacy of the pelvic floor is attested by the frequency with which portions of the abdominal and pelvic contents escape through some of its innumerable openings. The barrel shaped chest and constricted costal margin of woman with her large pelvis below still further favors the downward excursion of her abdominal contents. She is also unfortunate inasmuch as childbearing increases the inadequacy of the pelvic floor as a support and the accompanying abdominal relaxation adds materially to the downward tendency.

The stomach and bowel being the most motile portion of the abdominal contents, it follows, with the common or lesser degrees of abdominal relaxation, that they are most involved, and represent the immediate factors in many of the symptoms these patients describe. A caecum at or over the brim of the pelvis is usually a distended caecum, is tender to palpation and a common cause of right lower quadrant pain. A sigmoid abnormally folded on itself may give rise to the left side pain.

Of special significance, moreover, is the fact that one frequently finds pain and tenderness in the abdominal wall itself. Low abdominal distention gives rise to muscle fatigue and spasm, pain and tenderness in the abdominal wall. One can easily elicit this by palpating the abdominal wall between the fingers, this causing the same pain that deep pressure seemed to suggest was in a underlying structure.

The difficulty the uterus has in maintaining its top-like position, inadequately supported as it is, but furnishes another proof of a different plan on the part of nature, as well as steady employment for the gynecologist devising ways and means to keep it where it belongs.

The practical aspect of all this is that about one-fifth of his patients consult the gynecologist for backache, that a large proportion of these complain of indefinite low abdominal symptoms and that neither are accompanied by constant pelvic pathology and that a large number of these cases have varying degrees of postural faults. Shall he first proceed to correct, surgically perhaps, such pelvic pathology as he finds?

Appreciating the fact that the symptoms are due frequently to postural defects, it would seem the better part of judgment to correct them first, apply as it were a therapeutic test, and, by elimination to place the responsibility on the pelvic abnormality present, when it exists. Experience pretty definitely proves that in the greater number of cases the relief from the backache will be secured by correcting the postural defect and that a very considerable proportion of the abdominal symptoms described will be relieved in the same manner. A

not unimportant and obvious result becomes the avoidance of a certain amount of doubtful surgery. One need not emphasize that pathology, which in itself indicates surgery, obviously cannot be ignored.

The ideal course in the treatment of these postural defects is first prevention, opening up the subject of childhood and adolescent hygiene, which must be referred to the orthopedists and their co-workers, and second, the permanent cure of the individual adult.

If the adult patient could be taught to walk and stand correctly, if by regulated exercise her muscle tone could be brought to normal, if, with a gesture, the improper and fatigue producing apparatus of housework could be removed, if the height of all patients could be standardized, as well as sinks and tables, a cure for this housewife backache would doubtless ensue. This ideal, of course, is impossible of attainment. Even were it but a question of learning correct posture by systematic exercising, it would be impractical. These patients in the majority haven't the time to devote to a long drawn-out course of treatment. It becomes necessary to short cut in the search for relief. This short cut is obviously artificial support. The mere suggestion of apparatus almost defeats its own end, but a corset is more or less a permanent part of women's apparel, women who have gotten to the age of backache. The generation which has discarded its corset along with much of its other clothing has not yet lived long enough to come within the confines of the group under discussion.

If the corset which the average woman will wear anyway is properly cut, fits, and is worn correctly, it will accomplish for most of these cases the results we desire. It is a practical method to secure a result. There are certain specifications: the corset must be laced in front; it must have straight sides, to provide room laterally for some of the lifted abdomen which otherwise, held high in front, disturbs so greatly the equanimity of its possessor; it must have a well-boned, high back; it will be advantageously cut low in front; it should be worn laced as tightly as possible at the bottom, very loose at the top. Fitting well and worn properly, it gives sufficient support to relieve muscle strain and subsequent pain in the lumbar back, and by holding up the abdomen, lessens materially that group of symptoms due primarily to posed bowel and abdominal muscle strain. Proper corseting will take care of a very considerable number of these cases, enough to warrant it a standard first procedure for the backache which comes to the gynecologist. It takes care of practically that whole group which has its symptoms with exertion and its relief lying down.

A reasonable proportion of the cases which have backache only in bed are relieved by a

proper corset worn in the day time; others of this group are benefited by procedures which tend to minimize the extreme flexion these rigid backs are subjected to when sleeping in beds with soft mattresses and relaxed springs.

When a case which seemingly belongs to the postural group does not get relief at once from proper corsets, one should, before accepting demonstrable pelvic pathology as a probable cause, consider the possibility of a true arthritic condition, this to include also that intangible of intangibles, the sacro-iliac. The knee-chest position over a period of several weeks is a valuable addition to the treatment of the abdominal aspects of these cases. With the correction of the postural fault, and excluding arthritis, a backache persisting, one is reason-

ably justified to proceed on the theory that some definite pelvic pathology is its cause. If the displacement is suspected, knee-chest packs should be tried before resorting to surgery, for the backache which will be cured by a suspension will almost invariably be temporarily relieved by this knee-chest treatment.

Surgeons generally now insist on some sort of surgical corset after abdominal operations. It is a reasonable question whether the relief some patients have after suspension operations may not in large part be due to this corset, rather than the operation. A sufficient number of cases have been observed to have recurrent symptoms after operative treatment, when their special corsets are worn out, to prove this a fact in certain cases at least.

LIVESTOCK DISEASES AFFECTING PUBLIC HEALTH*

BY J. A. KIERNAN, V.S.

IN this era of preventive medicine, when common prudence supports public effort to build up our people against the ravages of disease, it is an opportune time to discuss briefly some of the maladies common to man and animals, and the relationship of livestock disease control work to the welfare of society.

A large part of our food is of animal origin. Our meat and our milk must be kept free from infections transmissible from animal to animal and from animal to man. In the vast enterprise of livestock-disease control the great motives are: First, to preserve our animal husbandry so that it may increase and expand upon a safe and sound health foundation; also, that we shall be assured of an adequate food supply for the present generation and be prepared to increase the supply for future generations. A very casual observation of the importance of this work will indicate the possibility of our food supply being cut short because of the various diseases to which livestock is heir.

HOG CHOLERA

One of the recent occurrences that brings out the importance of the issue was the rather extraordinary and extensive outbreak of hog cholera in 1926. It is possible to immunize swine permanently against hog cholera. This disease is due to a filterable virus. The efficacy of immunization has been demonstrated beyond doubt for a number of years.

Notwithstanding that fact, however, livestock owners in many localities have neglected to have their hogs immunized, and the outbreak which has swept the Corn Belt has caused the destruction of at least 1,500,000 swine. These hogs, if converted into hams, bacon and other pork products, would have yielded many million pounds

of edible food. No doubt, in the future, the livestock owners will be more careful and avail themselves of the anti-hog-cholera immunization.

FOOT-AND-MOUTH DISEASE

From time to time we have had outbreaks of foot-and-mouth disease in the United States. All of these have been promptly suppressed by the slaughter method—the destruction of all herds infected. The question is frequently asked: "Why destroy all the cattle in the herd when the disease seldom destroys affected animals?" Many methods have been employed in different countries of the world for the control and eradication of this disease, and the judgment of our leading livestock owners in America and our leading livestock sanitary officials and medical authorities is that the slaughter method is the one to follow, rather than isolation of herds, maintenance of quarantines, or other methods. While foot-and-mouth disease does not cause many affected animals to die, it causes great shrinkage in beef cattle and loss of milk production in dairy cattle, because it renders them incapacitated for their normal functioning. Furthermore, one attack does not immunize them against future outbreaks. Therefore, it is considered economically unsound to handle outbreaks in any other way.

INFECTIOUS ABORTION

Infectious abortion in cattle is a most serious disease. More research work on this disease has been done in the United States during the last twenty years than on any other disease of livestock. Dairy herds lose more animals through the infection of contagious abortion than any other disease, with the probable exception of tuberculosis.

In the *Journal of the American Medical As-*

*Read before Massachusetts Tuberculosis League, Inc., Boston, Mass., April 26, 1927

sociation February 26, 1927, Alice C. Evans describes twenty cases of human infection with organisms of contagion from Washington cattle, and intimates in the accompanying article that the infection may be of more frequent occurrence in humans than is generally supposed since the majority of these cases are recognized by a few observers who have their attention directed to the disease.

While the transmissibility of animal abortion to the human family is undergoing further research and investigation, it behooves us all to withhold conclusions until more definite evidence is adduced.

ANTHRAX AND GLANDERS

Anthrax is a disease that makes its appearance among cattle, horses, and mules in certain sections of the United States every year. There are sections where it is absolutely necessary to vaccinate the cattle against anthrax annually. From time to time human beings become affected with the anthrax bacillus and succumb to that disease. Glanders is another disease readily transmissible from the equine species to man.

Every effort is being put forth by the various State authorities and the livestock owners to keep the above-mentioned diseases, and many others, under control, and, as far as possible, entirely suppress them.

TUBERCULOSIS

Probably no disease affecting either the human race or livestock is better known, or has been the subject of so much study as tuberculosis. Present knowledge of the disease has been derived from many sources, including the work of eminent scientists who discovered its cause, and studies of the numerous ways by which it is spread, of the manner by which many animals contract it and the effects it produces.

The President of the United States, in his recent message to Congress, called attention to the importance of eradicating bovine tuberculosis. He said:

"Another preventive measure of great economic and sanitary importance is the eradication of tuberculosis in cattle. Active work is now in progress in one-fourth of the counties of the United States to secure this result. Over 12,000,000 cattle have been under treatment, and the average degree of infection has fallen from 4.9 per cent to 2.8 per cent. The Federal Government is making substantial expenditures for this purpose."

Again, in transmitting the Budget to Congress, the President said:

"For the eradication of tuberculosis in animals an estimate for \$5,853,000 is included in the Budget. This is an increase of \$1,200,000 over the amount provided for the current year. The continuing increase in the number of cities which have placed embargoes against milk from dairy herds which have not passed the Federal tuber-

culin test is placing a heavy burden on the owners of dairy herds, since slaughter of infected animals is the accepted method of eradication. The furnishing of pure milk is of vital importance to the health of the people. Because of its interstate character, it is entirely proper that the Federal Government share with the States the cost of protecting the purity of this great food supply. The amount included in the estimates should permit adequate prosecution of the work of eliminating tuberculous cattle from dairy herds. The results of the work already done warrant the belief that we can confidently expect the complete elimination of this menace to health. With this hope and probability in mind, there certainly is no excuse or warrant for the State or Nation to withhold the funds necessary to effectively carry on this important campaign."

This disease represents a tremendous economic loss to the Nation each year, and in addition and more important, it constitutes a major menace to the health of humans, especially children.

Much experimental work was done prior to 1917, which demonstrated conclusively the practicability of eradicating the disease from individual farms and farm areas. The systematic plan of tuberculosis-eradication work of the Department of Agriculture, in cooperation with the respective States, was started in 1917. At first major attention was given the problem as it pertained to the betterment of the livestock industry, and the effect of the disease upon human health was not emphasized. However, after a limited period of time the public-health aspects of the problem in many sections of the country came to be the predominating feature of the movement. This predominance of the public-health phase was brought about through the public's acquiring knowledge. It had been known for many years that bovine tuberculosis was readily transmissible to the human family.

Tuberculosis of livestock and poultry is an eradicable disease, and has been so declared for more than 30 years. Badly infected herds have been reconstructed into free herds and maintained on that basis indefinitely. On that premise the campaign is waged with confidence that herds that have been made free from tuberculosis will remain free until infection is reintroduced by a tuberculous cow or in some other way.

We all have reason to appreciate the insidious character of tuberculosis, and to be anxious lest infection should be reintroduced into free herds maintained in close proximity to infected herds. At the same time it has been demonstrated by experience that thousands and tens of thousands of herds in the Southern and Western States remained free from infection for years until exposed to infection by the importation of tuberculous animals.

The more attention given to the insidious nature of the disease the more apparent becomes the absolute necessity for suppressing the infection. This must be done before there can be any feeling of assurance that herds have been established permanently on a free basis. The presence of a badly diseased herd in a community may be a source of infection to herds theretofore free from tuberculosis.

DISPOSITION OF REACTING CATTLE

I desire to call your attention to a subject about which there is a great deal of misunderstanding; namely, the utilization for food of some of the carcasses of cattle which react to the tuberculin test. An excellent discussion of this subject is set forth in a decision by the Supreme Court of New York. The Court held the law respecting the tuberculin test constitutional, and found the cattle owner guilty who refused to permit his cows to be tested. The learned judge made this observation: "It is difficult for the lay mind to understand why the milk of a cow affected with tuberculosis is unfit for human consumption when the flesh of the same animal is so used with the sanction of the State."

When an animal reacts to tuberculin the reaction does not indicate the extent of the disease. A slight reaction may be found in an animal that is extensively affected with tuberculosis, and vice versa. However, even though a test were so delicate as to differentiate between cattle slightly affected and those more extensively involved, it would not be practical to permit the former to be retained in the herd for the reason that a slightly infected cow today may, within a few weeks, develop into an extensive case and spread the infection to the remainder of the herd.

On post-mortem examination many of the reactors consigned to the shambles show but slight localized lesions, and to consign entire carcasses of such animals to the fertilizer tank or trench would be like disposing of entire bunches of grapes because one or two grapes on the bunch are unsound, or entire apples because they contain decayed spots. It would be a wilful waste of wholesome food.

Total destruction of the carcasses of all reactors is not a new idea. Queries have been received periodically from individuals who can not understand how any part of the carcass of an animal which had reacted to tuberculin and had been condemned as unfit for breeding and dairy purposes could be passed as fit for food. This matter has been given very careful consideration from the standpoints of public health and economy, and I desire to make it as plain as possible that the disposition of carcasses slaughtered under the Meat Inspection Act is founded on sound principles, established by eminent physicians and veterinarians. Furthermore, the greatest care is exercised in carrying out these

principles in the post-mortem inspection and the disposition of the affected animals, and no "bad beef" is passed for human food.

In the course of slaughtering, animals which have not been subjected to the tuberculin test are frequently found tuberculous among the very best steers, bulls, beef cows, dairy cows, calves, and hogs, and the same principles are applied in the inspection and disposition of all tuberculous animals, whether they originate on the range or in areas engaged in tuberculosis-eradication work. The inspection is conducted uniformly in all cases in all establishments throughout the entire country.

Meat is considered an almost negligible factor in the transmission of bovine tuberculosis to human beings. The principal means of its transmission is the raw milk of tuberculous cows. In every land, in every generation, and from a very early period, the human race has endeavored to make safe for human consumption meat and other food products. In ancient times the Egyptians in their food laws designated certain animals—the hog, for instance—as unclean, and forbade man to eat of them. This prohibition was accepted by Semitic races, and was incorporated in the Mosaic laws of the Israelites; but the Greeks and the Romans had no prejudice against pork in their control over the meat supply. The Mohammedan food regulations of today are similar to the Egyptian food laws of ancient times.

A thorough, safe meat inspection can not be conducted on a basis of prejudice or ancient beliefs. Such a service must be founded on scientific facts established through our acquired knowledge of the various diseases. We believe our meat-inspection service meets this requirement.

TUBERCULIN TEST

From 1892, when tuberculin was introduced into the United States, to 1917, the year that marked the inauguration of the cooperative effort to exterminate tuberculosis from our livestock, many thousands of herds had been subjected to its searching qualities, and its reliability had been established beyond question of doubt. More than 34,000,000 cattle have been tested or retested with tuberculin in the cooperative campaign from 1917 to January 31, 1927; 1,173,626 cattle reacted to the test, and practically all of them were destroyed and autopsied. Definite macroscopic lesions of tuberculosis were demonstrated in 91.7 per cent. When lesions are not demonstrated on post-mortem, glands, or other tissues showing abnormality, are sent to the laboratory for further examination. In 20 per cent of such specimens the tubercle bacilli are found. With such a demonstration of accuracy of tuberculin are we not justified in classifying every animal that reacts to tuberculin an infected beast?

PERIOD OF INCUBATION

It is quite apparent that animals recently infected will react to tuberculin before any pathological change has taken place in the tissues. The period between the introduction of the organisms and the sensitization to tuberculin may only be a week or a fortnight.

The time required for the development of lesions varies greatly in individual animals. This condition has frequently been observed on many occasions. A tuberculous animal is introduced into a tuberculosis-free herd; the diseased animal is placed between two free cattle. Almost invariably the infection will spread to the two nearest cattle, which eventually react. On post-mortem one of these animals is frequently found to be a generalized case; whereas the other may show only slight lesions, with perhaps a process of healing going on. In all our work this unaccountable phenomenon of resistance and susceptibility is observed.

CONGENITAL TUBERCULOSIS

This body may be interested in the following post-mortem report on calves. From one abattoir alone post-mortem reports were received indicating generalized tuberculosis in 36 calves, the ages of which were given as follows:

- 1 calf less than 24 hours old
- 1 calf 1 day old
- 1 calf 10 days old
- 12 calves 1 week old
- 14 calves 2 weeks old
- 5 calves 3 weeks old
- 2 calves 4 weeks old

—
36 (total)

HEALTH OFFICERS REQUIRE MILK FROM
TUBERCULIN TESTED HERDS

During the last four or five years a large number of cities and towns have adopted ordinances requiring that all milk sold in their jurisdictions must originate from tuberculin-tested cattle. A total of 874 cities and towns have ordinances requiring the tuberculin testing of cattle furnishing milk for consumption. Official reports indicate that, with the exception of about one per cent, these ordinances are fairly well enforced. The action of such cities as Chicago, Cleveland, Detroit, Louisville and Boston in promulgating tuberculin test requirements has stimulated interest in the subject. The Bureau of Animal Industry, through its field officers and stations, and State livestock sanitary authorities, in 1926, made a survey of the subject. This survey showed that, in addition to the large cities, smaller communities also are active in safeguarding their milk supply.

In addition to the 874 cities having tuberculin test ordinances, 375 provide an option between the tuberculin test and pasteurization. Thus, a

total of 1,249 municipalities have taken positive steps to safeguard their milk supply from the possibility of disease transmission. A study of the reports from the various States explains the rather general adoption of pasteurization as an additional safeguard, even when the cattle are tuberculin tested. Proper pasteurization, as is well known, destroys any infection from disease producing organisms that may be present. It also gives double assurance that the product drawn from healthy cows will not become infected after the process of milking.

It is not unreasonable or visionary to anticipate the time when all milk consumed by the people living in towns and cities will be derived from tuberculosis-free cattle. It is more important, though, that milk consumed on farms should also come from healthy cattle because there it is more commonly consumed raw. We are frequently confronted with physical evidence of tuberculosis in children on farms where the tuberculin test reveals the existence of the disease in the cattle.

The statement has often been made that the ingestion of the bovine tubercle bacilli confers immunity against human tubercle bacilli, and that the infection by the former type might be used in combating human tuberculosis. Dr. Schroeder, of the Bureau of Animal Industry, in discussing this phase of the subject, holds the position that it should be definitely proved, and that, after it has been proved, not before, we may consider the propriety of permitting children to ingest bovine tubercle bacilli, not indiscriminately but in carefully measured, numbered and timed doses of a carefully determined degree of virulence. Science demands precision, exactness and care, especially when children are treated with possible beneficial agencies which, when used carelessly or inaccurately, are known to cause disease and death. Apart from this, the vicarious sacrifice of children to secure benefits of any kind is an abhorrent idea.

ACCREDITED-HERD PLAN

After years of experimentation it was definitely determined that tuberculosis might be exterminated from a herd of cattle, and that when such a herd became free it might be maintained on that basis for an indeterminate period. Upon that fact the plan of accrediting herds of cattle was launched in 1917. Briefly, the plan consists in certifying by the State and National governments the freedom from tuberculosis of herds that have undergone two annual tuberculin tests without reactors or three semiannual tests without reactors. The plan has extended so that now it is in operation in every State. Thousands of herds heretofore diseased have been transformed into tuberculosis-free herds and kept in that status.

The plan is too well known to justify a detailed description of it. The weakest point in the plan that has been uncovered is the fact that

it does not contemplate the elimination of infection from adjacent herds, and therein lies the potent danger in reinfesting accredited herds. A study was made only a short time ago of the number of accredited herds that become reinfected. This study covered 18,795 herds fully accredited. These herds were retested annually with the result that 5 per cent of them were found to be infected. The cause of reinfection in the majority of cases was the addition of cattle, which in a later test were found to be tuberculous. Experience has taught that it is only by the practice of eternal vigilance that infection can be kept out of herds the owners of which are buying and selling cattle.

I might cite one instance of an accredited herd that has been maintained on that basis for many years. This herd when first tuberculin tested more than 25 years ago contained 80 reactors. They were removed and the herd gradually built up to its former size, but instead of a diseased herd it was tuberculosis-free, and has been maintained in a free status for a period of 15 years. This was accomplished only by the exercise of the greatest precaution.

AREA PLAN

At the time the accredited-herd plan was adopted provision was made for the eradication of the disease from all the herds of cattle within a circumscribed area. This plan consists of the organization of the livestock owners within the area agreed upon, which is usually a county. Now, the average county contains approximately 15,000 or 20,000 cattle, although some counties are known to have more than 100,000 cattle. The project is to eradicate the disease from all the infected herds in the county. In order to do so it is necessary to test all herds and every animal in each herd, even down to calves a few days old. The work is conducted with just as much skill and thoroughness as though but one herd were to be subjected to the test. The veterinarian makes a thorough study of each herd, applies the tuberculin test, and watches its result with the same earnestness that he would show if he were testing a herd the individual animals of which were worth thousands of dollars. It is only by the exercise of thoroughness that the desired results may be obtained.

The methods of applying the tuberculin tests are the subcutaneous, the intradermic and the ophthalmic. The former has been employed in the United States from the date of introduction of tuberculin; the intradermic was not recognized as an official test until 1920; the ophthalmic is used as a supplementary test to the other two, but is considered highly valuable in the diagnosis of the disease.

Tuberculin, like all other biological agencies, has some limitations, but its degree of accuracy

is so high that it inspires absolute faith in those most familiar with its use.

The area plan is the predominating project in the present-day campaign of eradication. It is in operation in 884 counties. These are approximately one-third of the total counties in the United States. It is gradually being extended, and in time will be in operation everywhere throughout the Nation.

MODIFIED ACCREDITED AREAS

When tuberculosis is reduced to less than one-half of one per cent of the total cattle in an area the Federal Government declares it a "Modified Accredited Area," provided the initial test showed the infection to have been less than one per cent. If the infection is greater than one per cent, all the cattle are again subjected to retest after a period of 12 months, and that process continues until the infection is reduced to one-half of one per cent.

Areas are accredited for a period of three years, after which period it is necessary to retest for reaccreditation. On March 1, 1927, there were 302 counties in the modified accredited area. Each month additional territory is placed in that status.

PUBLIC HEALTH ASPECT

As livestock workers desirous of rendering service to the great industry in our particular capacity—disease control, our aspirations have been, are now, and ever will be in these United States to keep our livestock free from the infections that cause death, debilitation, lack of production, and loss to the owner. We have ample grounds upon which to predicate our work from the economic importance of controlling diseases of livestock, for it was on that program that the tuberculosis campaign was inaugurated. However, there is another aspect to the subject that is at least of equal importance, if not greater, and that is the public-health aspect. It was believed for a number of years before Professor Koch stated that there was no danger of transmitting tuberculosis from animals to man, that it was necessary to control this disease because it was communicable to human beings. Upon that platform the Federal Meat Inspection was inaugurated about 1892 (that was 14 years before the Federal Meat Inspection Act was enacted in Congress). The Chief of the Bureau of Animal Industry, at that time Dr. D. E. Salmon, saw plainly that in order to protect consumers of meat products from infection of diseases transmissible from animal to man, it was necessary to make post-mortem examinations on all animals slaughtered for food. His jurisdiction at that time was rather limited, but he established inspection in many parts of the United States, which gradually expanded until the Act was passed by Congress in 1906. Dr. Salmon was one of the

veterinarians who took issue with Dr. Koch regarding the relationship of animal tuberculosis to man, and in a bulletin published by him soon after the conference at London he pointed out the danger, and insisted upon the necessity of meat inspection as a safeguard for public health. Much could be said relative to the transmissibility from animal to man of tuberculosis, but time will not permit a lengthy review of work done by many investigators throughout the world. It is believed proper, however, to call to your attention the most excellent report made to the Medical Research Council of Great Britain by Dr. A. Stanley Griffith, Pathological Department of the Field Laboratories, University of Cambridge. This article, entitled, "The Danger of Tuberculous Milk," being one of the most comprehensive papers on the subject, I take the liberty of reading it to you in full.

THE DANGER OF TUBERCULOUS MILK

By A. Stanley Griffith, M.D.

There is a general agreement among medical and veterinary men that the milk of cows with clinically recognizable tuberculosis, either of the udder or of the internal organs, ought not to be used as food. Such milk is liable to contain large numbers of tubercle bacilli, and as an article of diet is a source of grave danger both to man and the domesticated animals. Medical opinion is, however, not unanimous upon the desirability of attempting to eliminate all tubercle bacilli from milk.

It has been suggested on purely theoretical grounds that the ingestion of small doses of living bovine tubercle bacilli in milk might protect children against serious infection from human sources. According to this hypothesis the complete eradication of cattle tuberculosis might deprive the community of a safeguard and might lead to an increase in the ravages of the human tubercle bacillus.

I should like to point out that the results of investigating human tuberculosis lend no support to the conception that the bovine tubercle bacillus exerts so favorable an influence. The actual figures show that the bovine tubercle bacillus is a menace to the community and a cause of suffering and death in children.

At the National Milk Conference held in London in 1922 I gave the results to that date of investigations made to determine the relative proportion of bovine to human infections in different varieties of human tuberculosis. These investigations showed conclusively that a considerable amount of human tuberculosis is caused in this country by the bacillus of bovine tuberculosis, especially in children under five years of age. The bovine tubercle bacillus was found in all the chief clinical varieties of tuberculosis, and in many cases of fatal general

tuberculosis. The proportion of bovine to human infections was highest in children under five years of age, and in those forms of tuberculosis which affect primarily the mucous membrane or the glands of the alimentary tract.

The age incidence and anatomical distribution of the disease clearly pointed to cow's milk as the source of infection with bovine tubercle bacilli.

Table I, which gives the percentage of cases infected with bovine tubercle bacilli (a) in children under five years of age, (b) in persons at all ages, shows at a glance the extent of the danger arising from the consumption of infected cow's milk revealed by these investigations.

I have continued my investigations of the subject and during the years 1922-23-24 I have examined material from forty-five persons suffering, except in four instances, from surgical forms of tuberculosis. The majority of these cases were under the care of Sir Henry Gauvain, to whom I am greatly indebted for his cooperation in my inquiries.

In Table II the results of the investigations of these forty-five cases are summarized.

TABLE I

Compiled from Royal Commission on Tuberculosis Reports and Papers Published by A. Eastwood and F. and A. S. Griffith.

Variety of tuberculosis	Number of cases	Percentage of cases infected with Bovine Tubercle Bacilli	
		Under 5 years of age	All ages
Cervical gland.....	125	85.0% of 20 cases	48.0%
Lupus.....	140	66.0% of 50 cases	51.0
Scrofuloderma.....	52	58.3% of 12 cases	38.4
Bone and joint.....	514	30.3% of 96 cases	19.2
Genito-urinary.....	21	.....	19.0
Meningeal.....	12	.....	16.6
Pulmonary.....	275	.....	1.1
Post-mortem cases in children under 12 (L. G. B. series).....	113	21.3% of 61 cases	17.6
Post-mortem cases in children under 12 years classified according to the anatomical distribution of the primary lesions (L. G. B. and Commission's series), showing percentage of bovine infections:			
Alimentary.....	35	.....	80.0
Respiratory, double portal (respiratory and alimentary) and uncertain.....	116	.....	1.8

The figures show that 50 per cent of the lupus cases and 40 per cent of the bone and joint cases were of bovine origin. It will be seen that the latter percentage is higher than in the series of bone and joint cases in Table I, but the total number of cases is small.

There was one fatal case of bovine infection, and as this was of exceptional severity, a brief

account of it will be of interest. I am indebted to Dr. J. F. Gaskell, Cambridge, for sending me the notes of the case and the material for bacteriological examination.

The patient was a girl, aged seven years, who lived on a small farm and was accustomed to drink large quantities of cow's milk. She died of general miliary tuberculosis after more than

TABLE II

Variety of tuberculosis	Number of cases	Under 15 years of age		Over 15 years of age	
		Human	Bovine	Human	Bovine
Lupus and scrofulodermia	22	11	11	—	—
Bone and joint	13	6	4	3	—
Cervical gland	4	—	1	3	—
General	2	1	1	—	—
Meningeal	2	2	—	—	—
Kidney and testis	2	—	—	2	—
	45	20	17	8	—

six months' illness in the hospital. Autopsy showed a large tuberculous ulcer spreading from the ileocaecal valve a considerable way round the caecum. In the mesentery extending from the ulcer was a chain of enlarged caseous glands. There were unusually coarse tubercles in liver, spleen, and kidneys. The lungs contained miliary tubercles throughout, and in the lower lobes there were, in addition, a few large greyish-red areas almost pultaceous in consistency. The tracheal and bronchial glands were not markedly enlarged. Tubercle bacilli were extremely numerous in all the organs. A bovine culture, highly virulent for rabbits, was obtained from the liver.

Interesting features in this case were the single ulcer in the intestines (in a situation which Dr. Gaskell believes to be a common seat of primary tuberculosis in children), the chain of enlarged glands extending from this ulcer, and the extremely large numbers of tubercle bacilli in the organs. The general infection in this case appears to have originated from a single primary focus in the intestines.

DISCUSSION

The view that the ingestion of small numbers of bovine tubercle bacilli in milk may be bene-

ficial to children is apparently based on two assumptions: (1) that the bovine tubercle bacillus is less virulent for man than the human tubercle bacillus, and (2) that small doses of living bovine tubercle bacilli taken with food raise the specific resistance of individuals without producing serious disease. In 1922 (*loc. cit.*) I gave the evidence which I think justifies the conclusion that the bovine tubercle bacillus is not intrinsically less virulent for man than the human tubercle bacillus. When a comparison was made of the post-mortem cases in which the portal of entry for the two types was the same, it was clear that the bovine tubercle bacillus produced tuberculosis, whether generalized over the body or apparently localized in one organ, in every way as severe as that caused by the human tubercle bacillus.

With regard to the second point there is no doubt that small doses of tubercle bacilli swallowed with food are less certain to infect than large doses. This fact was clearly brought out by the numerous feeding experiments of the Royal Commission on various species of animals. While it is true that many of the children who died of bovine tuberculosis of alimentary origin owed their infection to the ingestion of large numbers of tubercle bacilli (this is indicated by the extensive lesions in the intestinal tract and mesenteric glands) there is abundant evidence that much serious and fatal disease is caused in children by small doses of bovine tubercle bacilli. In support of this statement, I will mention two fatal cases in children. They were aged two and six years respectively and both died of tuberculosis meningitis. At the autopsy in each case only a minimal lesion was found in the glands of the mesentery.

In addition, there is little doubt that the vast majority of the cases of surgical tuberculosis of bovine origin was produced by small doses of tubercle bacilli, since in these cases there was clinically no evidence of disease of the alimentary tract.

CONCLUSION

(1) A small dose of bovine tubercle bacilli may set up serious and fatal tuberculosis in a susceptible human being.

(2) In the present state of our milk supply the bovine tubercle bacillus causes a considerable amount of preventable disease and loss of life.

HISTORICAL OUTLINE OF THE CAMBRIDGE ANTI-TUBERCULOSIS ASSOCIATION—1902-1927*

BY MRS. MABEL GREELEY SMITH,
Executive Secretary

IN 1902 the Home Missionary Society, First Church, Congregational of Cambridge, appointed a committee of three, consisting of Mrs. Rufus P. Williams, Chairman, Miss Maude E.

Batchelder (now Mrs. Charles P. Vosburgh), and Mrs. W. B. Durant, to investigate the needs of the sick in the City. On November 5, 1902, upon the recommendation of this committee, the Home Missionary Society voted to launch a project for the relief of consumptives and em-

*Published in connection with the Annual Report of the Massachusetts Tuberculosis League, 1927.

powered the above committee to "attend to the business of the new movement and to make a definite plan by which nutrition and care can be supplied tuberculous cases for a small amount or free of charge." Believing "the new movement to be too large and of too much interest to the entire city to be confined to one society," it was recommended "that other churches be asked to unite with us and also the men's and women's clubs of the city;" "that associations thus uniting be represented on the Advisory Board and that a special Advisory Board of Medical Experts be formed to whom we may look for scientific guidance."[†]

With the constant advice and encouragement of Dr. Edward O. Otis of Boston, this committee proceeded with the work of organization, finding leaders in the various social and civic groups and in the medical profession glad to unite for service in this "new movement," and on October 30, 1903, the Tuberculosis Aid and Education Association, later rechristened the Cambridge Anti-Tuberculosis Association, was formally organized, with Mr. Archibald M. Howe as its first president. The immediate problem confronting the new Association was two-fold,—the discovery and care of cases of tuberculosis, and an educational program that would arouse the community to an understanding of the importance of combating this disease.

It was the policy of the Association from the first to use existing resources, to work with city officials and to develop a public opinion that would support their progressive policies.

The various projects started by the Association have been turned over to city officials as soon as their value was demonstrated and the city ready to assume responsibility for carrying them on. The steady growth of the Association in service to the community testifies to the wisdom and soundness of the policies adopted by its founders.

During the first year a collection of books and pamphlets on tuberculosis was placed in the Public Library. A circular describing the nature, cause and treatment of tuberculosis was distributed in homes by Visiting Nurses and Social Workers. Bedside care was provided by the Visiting Nursing Association. A fund for the relief of patients was raised and was administered by the Associated Charities, to whose General Secretary, the late Miss Mary L. Birtwell, we would here pay our tribute of respect and gratitude for her wise counsel in helping to shape the policies of the young Society.

In the fall of 1904, enough interest and financial support had been secured to warrant placing the Association on its own feet, and on October 11, 1904, a Social Worker was employed who has remained with the Society up to the

present time, and on December 1, 1904, an office was opened at 678 Massachusetts Avenue. Physicians and Social Agencies were invited to refer cases for consultation and care. This first year 153 patients were referred and were provided with hospital or sanatorium care or supervised at home. The Cambridge Board of Health had placed tuberculosis on the list of reportable diseases in 1903, four years before the State law made tuberculosis a reportable disease. Cases reported to the Board of Health were referred to the Association and, in consultation with the attending physician, a plan was made for each patient.

A card catalogue of houses occupied by tuberculosis cases was begun, which list formed the basis of a study of housing conditions made in 1909, and led to the formation of the Cambridge Housing Committee, whose accomplishments have been notable.

February 1, 1905, a Dispensary was opened with a staff of volunteer physicians organized by Dr. Eugene A. Darling. To the weekly morning and evening clinic was soon added a children's clinic, then a second children's clinic in East Cambridge, with classes in breathing exercises, posture and personal hygiene. A little later a dental clinic was added, the equipment of which a year later, was placed in one of the schools and led to the school dental clinics now conducted by the Board of Health.

A Tuberculosis Class, similar to the Emmanuel Church class, organized by Dr. Joseph H. Pratt of Boston, was opened under the direction of Dr. Fred R. Jouett, for the care of patients who could not be provided for in institutions. With the coöperation of the Visiting Nursing Association, a nurse was added to the office staff. By 1906 it was evident that provisions for sanatorium or hospital care of patients was entirely inadequate and agitation was begun for a local Hospital and Day Camp.

In 1905, Dr. Eugene A. Darling succeeded Mr. Howe as president and remained at the head of the Association until 1925, except for a year's absence during the World War. The steady growth of the Association in prosperity and usefulness testifies to the sound judgment and wise leadership of Dr. Darling during these twenty years.

Meanwhile much educational work had been going on. The Medical Advisory Committee kept physicians in touch with the work. Many lectures each year were given before Mothers' Clubs and Labor Unions and in churches. Ten thousand leaflets were distributed by the School Department in the schools. Employers were interviewed and clinics for physical examinations were held in several factories. A vigorous campaign for the abolition of the common drinking cup in factories and public places, and for the enforcement of the law prohibiting spit-

[†]Quotations are from the records of the November 5, 1902, meeting of the Home Missionary Society.

ting, was carried on. An outstanding event of 1908 was a Tuberculosis Exhibit lasting a week with an attendance of more than 8,000 persons. Lectures and demonstrations were given daily; the schools sent delegations of children, who later submitted hundreds of compositions on what they saw at the Exhibit. One composition contained the startling announcement that "tuberculosis was started in 1872 by Dr. Trudeau and since that time has become very popular."

Another important event of 1908 was the establishment of a Tuberculosis Day Camp and Hospital by the Board of Health.

In 1910, the Association coöperated with the School Department in establishing an Open Air School for undernourished children, the second such school in the country. The following year the School Department took over the entire support of this school and has since established four more Open Air Schools.

A milestone was passed in 1915 when a State law became effective, requiring cities to establish Tuberculosis Dispensaries and Hospitals. At the end of this year, a Dispensary having been opened by the city and the Hospital having been enlarged to a capacity of 150 beds, the Association closed its Dispensary and turned over all responsibility for the care of patients to the Board of Health. The state had increased the number of state sanatoria to four, which, with the local Hospital, provided an ample number of beds for all Cambridge cases.

From 1904 to 1916 the Association had cared for over 3,000 cases of tuberculosis and had an active list of over 800 patients and families at the time this part of its work was turned over to public officials.

Since 1916 the work of the Association has been largely educational, with emphasis laid on the promotion of the health of children. Outstanding projects of those years are:—

SUMMER CAMPS

In 1917 the Association proposed to the School Committee a summer open air school, so that the children from the regular open air schools might have special attention throughout the year.

Such a school, called a Children's Day Camp, was opened by the School Department that summer, using the Haggerty School and the lovely region around Fresh Pond for that purpose. The School Committee provided the school building, teachers, matrons, and cooks. The Board of Health supplied physicians and nurses, and this Association provided transportation and food.

Under this fine coöperative plan the children's camp, which numbered 100 that first summer, has grown to 800, and for the last five years two school buildings have been used for this summer work.

HEALTH CENTER

From 1920 to 1924, the Association and the Cambridge Visiting Nursing Association carried on a Health Center in East Cambridge in a public school building, loaned by the School Department. The project had the coöperation of public officials, physicians, clergymen, social workers and other leaders of the neighborhood. The work was educational, and consisted of Children's Clinics for health examination, classes in nutrition, corrective exercises and mothercraft, mothers' meetings, home visiting, and nursing services in the nearby Polish parochial school.

PREVENTORIUM

In 1924 an arrangement was made with the Sharon Sanatorium for the use of six beds for children predisposed to tuberculosis. These children are referred by the Board of Health Tuberculosis Dispensary.

EDUCATION

An educational program includes Health Classes for undernourished children carried on in public schools; promotion of health programs in Parochial Schools, and assistance in carrying them on; provision of health teaching material for teachers in Public and Parochial Schools, and for social workers and public health nurses; health talks for mothers' clubs, churches, factory groups, etc.; a Health Information Bureau, providing information concerning hospitals and sanatoria, a directory of health agencies, and speakers on Health subjects.

The Association is constantly engaged in studies of special needs in the health field and uses its resources, by demonstration or otherwise, to promote effective measures for better health and the control of tuberculosis.

HELIO THERAPY

Under the direction of Dr. Hilbert F. Day, who succeeded Dr. Darling as President in 1925, a demonstration of the value of sun treatment for undernourished children was made for eight weeks during the summer of 1926. The school committee generously gave the use of the Agassiz School for this purpose, on the roof of which twenty children gathered daily for systematic sun exposure, supplemented by proper food, rest hours and training in posture and health habits. The results were so encouraging that a larger Sunshine Camp for day and night care of children will be carried on this summer.

With the exception of the Health Center, the above described activities are included in the 1927 program.

Case Records
of the
Massachusetts General Hospital

ANTE-MORTEM AND POST-MORTEM RECORDS AS USED IN
WEEKLY CLINICO-PATHOLOGICAL EXERCISES

EDITED BY R. C. CABOT, M.D.

F. M. PAINTER, A.B., ASSISTANT EDITOR

CASE 13221

NINE MONTHS' PAINLESS JAUNDICE.
THREE WEEKS' ASCITES

MEDICAL DEPARTMENT

An unmarried American secretary fifty-two years old entered the hospital March 3 complaining of jaundice.

For five years she had not felt so well as usual. Three years before admission she had severe itching of the skin irritated by scratching until severe dermatitis resulted. A dermatologist made a diagnosis of scabies and treated her without relief. Another physician gave her sodium phosphate and Fowler's solution with relief in a week and cure in a few months. Fourteen months before admission she was laid up for two weeks with infection of the right nasal sinus following a cold in the head. A year before admission she got a foreign body in her eye resulting in a corneal ulcer. This cleared up without injury to the vision. During all this time she was getting more run down and losing weight. The June before admission she began to have jaundice. This she thought had grown less intense lately. For the past few months her urine had been dark colored. Three months before admission she had clay colored foul smelling stools. For three months her clothing had shown yellow staining. Occasionally she had had some discomfort from gas with some belching, especially during the past two months. Two months before admission she had infection of the left nasal sinus. Three weeks before admission she first noticed swelling of the legs, feet and abdomen which had increased until it now extended above the waist line. This was worse when she was on her feet all day and least when she got up in the morning. She had lost twenty-five pounds in the past five years, but had gained back five pounds since Christmas. She had lost little if any strength.

The patient's mother and all her mother's brothers and sisters died of tuberculosis of the bowels. The patient was exposed. From girlhood until fifteen years before admission she had attacks of very severe headaches every four to six weeks accompanied by nausea and vomit-

ing. She believed these were due to constipation which she always had had and still had. She had tonsillitis once or twice every winter until she was twenty-five, when she had diphtheria, treated with antitoxin. She had been occasionally troubled with "muscular rheumatism," easily relieved by aspirin. She had not had this for several years. During the past year she had menstruated only four times.

Clinical examination showed a somewhat undernourished woman, comfortable and alert. The skin and head, upper limbs and trunk showed a slight tinge of jaundice. The sclerae were icteric. The throat was slightly injected. The tonsils were deep-seated, fibrotic. A caseous mass was pressed out from the right tonsil. There were chains of pea-sized to marble-sized posterior cervical, supraclavicular, infraclavicular, axillary and epitrochlear glands. The apex impulse of the heart was felt in the fourth interspace 6 centimeters to the left of the midsternum, one centimeter inside the midclavicular line. A systolic thrill over the base. Sounds and action normal. A blowing systolic murmur all over the precordium, best heard over the pulmonic area. Pulses and arteries not remarkable. Blood pressure 135/90 to 120/70. Lungs normal. Abdomen distended. Umbilicus flattened. Shifting dullness and fluctuation. Rectal examination: external hemorrhoids. Vaginal examination: fundus rather hard and nodular; questionable fibroids. Slight pitting edema of the legs and feet. Pupils slightly irregular. Right larger than left. Both reacted sluggishly, especially to light. Right knee-jerk not obtained, possibly because of edema. Dorsalis pedis arteries not felt.

Amount of urine not recorded. Urine brown, specific gravity 1.022 to 1.026, the slightest possible trace of albumin at all of 3 examinations, bile at all, a slight trace of acetone at 1 of 3; rare bile stained casts at two examinations, 1 to 3 leucocytes at all. No melanin (sunlight 9 hours.) Renal function 50 per cent. Blood: 5,450 to 5,900 leucocytes, polynuclears 70 per cent., hemoglobin 55 per cent., reds 3,312,000 to 3,168,000, slight achromia, some anisocytosis and poikilocytosis, platelets normal. Wassermann negative twice. Non-protein nitrogen 25. March 9 clotting time 7 to 8 minutes, icterus index 75. March 10 clotting time 20 to 25 minutes, icterus index 15. Rosenthal bromsulphalein test: dose 2.4 cubic centimeters; unable to get any blood. Gastric analysis: Fasting contents 20 cubic centimeters clear green acid material with one ounce of amorphous sediment, no free hydrochloric acid, total acid 7, guaiac very strongly positive. Microscopic examination, no Oppler-Boas, rare sarcinae, a few pus cells and red blood cells, many yeasts. Test meal 50 cubic centimeters of bread sediment with one brown-

ish fleck, possibly blood. Last 5 centimeters coffee-ground. No free hydrochloric acid, total acid 27, guaiac very strongly positive. Microscopic examination as above plus starch. Stools clay colored at 2 of 6 examinations, guaiac positive at all, strongly positive at 4, bile absent.

X-ray examination with a barium meal was made in the recumbent position only. Because of vomiting in the morning the patient was not given the usual motor meal. The examination showed no evidence of organic disease of the stomach or duodenum. There was no delay in a barium enema and nothing to indicate filling defect. The abdomen was distended with fluid so that the colon could not be palpated well. The transverse colon was slightly posed. The teeth were negative. The diaphragm was high on both sides, sharply outlined, and moved normally with respiration. The lung fields were slightly less radiant than normal, perhaps because of the high position of the diaphragm. The kidney outlines were not visible on either side. No evidence of stone. The abdomen was unusually dense. Very little gas was seen. Plates of the gall-bladder were unsatisfactory because of the large amount of fluid in the abdomen. The frontal sinuses appeared normal. The antra were a little hazy, but sharply outlined. No positive evidence of disease.

Temperature 97° to 99.2° with a terminal drop to 95°. Pulse 82 to 102. Respirations normal.

The patient was remarkably free from gastro-intestinal disturbances while in the ward. She was rather tired after the X-rays, but had no definite discomfort except abdominal distension.

The visiting physician found too much ascites to feel the liver or spleen and thought exploration should be offered if the surgeons wished it. A surgical consultant felt by rectum a transverse mass behind the cervix, apparently in the pouch of Douglas. He found the diminution of jaundice hard to explain on the basis of the diagnosis which nevertheless he thought probable. He believed that operation would accomplish nothing more than establish diagnosis.

The morning of March 17 soon after a light breakfast the patient collapsed. The blood pressure fell. She vomited an ounce of bright blood. After this she rallied for a few hours under treatment, but later vomited three kidney basinfuls of practically pure blood and again collapsed. Transfusion was considered carefully but not done as it was considered of questionable temporary and no permanent value. After remaining two hours in deep shock the patient died.

At the death one cubic centimeter of 1/1000 adrenalin solution was given intracardially into the midst of the ventricle cavity. Within a few seconds the needle began to oscillate with the chest wall as fulcrum. The heart sounds again became audible and a faint pulse was pal-

pated in the wrist. Normal saline and 2½ per cent. glucose was delivered warm and air-free directly into the heart, 250 cubic centimeters in five minutes. At the end of five minutes the oscillations became weaker and the pulse was no longer palpable. The needle was accordingly withdrawn. All this time the patient did not breathe spontaneously although artificial respiration had been continued with short interruptions. It was noted that the needle by its lever-like position recorded movement of the ventricle when no sound was audible by stethoscope.

DISCUSSION

BY RICHARD C. CABOT, M.D.

NOTES ON THE HISTORY

We are dealing with a woman of fifty-two, without any known alcoholic history, with infections in various parts of the body which do not seem to me to have any connection with the illness for which she came here. She comes here for nine months' jaundice plus a good deal of ascites, some swelling of the legs, and that is all. There were no pains, no gastro-intestinal disturbance. She complains of nothing except the jaundice and the dropsy.

NOTES ON THE PHYSICAL EXAMINATION

Physical examination shows very little. The jaundice is of a considerable but not extreme grade. The glandular enlargement all over the body is perhaps the most definite lesion, glands from pea size to marble size in a number of places. Owing to the amount of ascites found in the abdomen they could not feel the liver or the spleen, though they thought both would probably be found enlarged if they could get rid of the fluid.

A surgical consultant found a mass behind the uterus which he interpreted I suppose as a nodule of malignant disease. It is quite possible however that it was feces in the colon. No definite decision on that can be made.

The gastro-intestinal tract was pretty thoroughly investigated. There was no hydrochloric acid in the stomach contents. There was a positive guaiac six times in the stools. Nevertheless the X-rays were negative, and she had had no digestive symptoms, no gastric trouble at any time. So that I am inclined to think the gastro-intestinal tract had no important bearing on the case.

She showed a moderate degree of anemia.

The chest was essentially negative, the lungs absolutely so, both by X-ray and clinical examination.

The heart was negative except for a supposed systolic thrill at the base. As that is mentioned only once, as there are no other facts in the cardiac examination to back it up, I am on the whole inclined to disregard it. A systolic

thrill at the base of the heart is always important, always means organic disease. But I have never known a case where there was a systolic thrill and nothing else wrong with the heart. It is always one of a group of symptoms, and there is no such group recorded here.

On the part of the nervous system we have the absence of knee-jerks, which does not mean a great deal when the legs are edematous, and the slightly irregular pupils. I should think this not enough to mean tabs or any other disease of the nervous system.

We come down then to a jaundice of nine months' duration, without pains, without any fever, but accompanied during the last few weeks by ascites. There is said to be only a moderate amount of edema in the legs, so the ascites is probably due to an obstruction in the portal system. The absence of disease in the lungs or kidneys supports that idea.

This case shows, then, the association of a nine months' jaundice and a three-weeks' portal stasis with moderate secondary anemia and some enlarged glands; also with a possible mass behind the uterus. That is the whole case except that on the day of her death she vomited blood, just how much we cannot find out, but a considerable quantity of pure blood. She had never done anything of the kind before, and it came without any warning.

The last paragraph of the case deals with some attempts to see what they could do with intracardiac stimulation in a person who was essentially dead when they began, in whom they reestablished cardiac movements although they could not reestablish respiration, and who went on to death nevertheless.

DIFFERENTIAL DIAGNOSIS

The things to be considered are cirrhosis of the liver and some form of malignant disease obstructing the bile-ducts. In favor of cirrhosis are the long duration of the case, without pain, without much loss of efficiency or strength, and without any other localizable symptoms, also the terminal vomiting of blood, presumably from gastric or esophageal varices.

There is nothing in the case that cannot be explained by the diagnosis of cirrhosis of the liver. The enlarged glands are the most difficult point. The largest is said to be as big as a marble, and that is a little larger than we like to pass over without explanation. Jaundice of nine months' duration is not usual in cirrhosis of the liver, but it is not at all uncommon. Aside from that and these glands and the supposed mass behind the uterus, everything fits well with the diagnosis of cirrhosis. It is true we have no alcoholic history, but nothing is said about alcohol one way or the other; there may have been an alcoholic history unknown to us.

MISS PAINTER: The patient denied it.

DR. CABOT: In favor of malignant disease what have we? We have these glands which may have been a part of a generalized lymphomatous process, nodules of which may have compressed the bile ducts and thus have produced the jaundice, may have compressed the mesenteric vessels and thus have produced ascites. If we had tapped the abdomen we could probably have found out about those things. The mass behind the rectum of course would then be interpreted as a tumor, otherwise as feces.

The important thing is: nine months of jaundice without pain and with only very recent portal stasis. Cancer of the pancreas, which is perhaps the commonest cause of such a chronic, painless jaundice, cannot be excluded. But the jaundice in that condition, when it has lasted so long as this, is usually much more intense, and the patient's condition at the end of nine months ordinarily is not so good. So that as between the two things that I have considered I am inclined towards cirrhosis of the liver. I have a feeling that it is not either of the two I have considered, and that I ought to be considering something else, but I cannot see what that something else should be. The moderate secondary anemia goes perfectly well with either of the diagnoses I have considered. The terminal gastric hemorrhage certainly goes better with cirrhosis than with malignant disease.

A PHYSICIAN: In your opinion did she have a systolic thrill?

DR. CABOT: In my opinion she did not. If she did have it then I am wrong, and we have to suppose something else wrong with the heart. But then there ought to be more data. It is put down as if they were not much startled by it. A person should have his hair stand on end when he feels a systolic thrill, and he should show excitement in his record. This is put down so coolly that my impression is that they thought it was an everyday sign which almost anybody might have.

The patient had no temperature throughout. I do not see why we should consider any of the infectious causes of jaundice. They took or tried to take X-rays of the gall-bladder, but were not very successful, so I do not think the results count much either positively or negatively. That is as far as I can go.

CLINICAL DIAGNOSIS (FROM HOSPITAL RECORD)

Abdominal carcinomatosis?

Cirrhosis of the liver?

Acute and chronic gastro-intestinal hemorrhage.

DR. RICHARD C. CABOT'S DIAGNOSIS

Cirrhosis of the liver.

ANATOMIC DIAGNOSES

1. *Primary fatal lesion*

Cirrhosis of the liver, toxic type.

2. *Secondary or terminal lesions*

Esophageal varices (with fatal hemorrhage).
Cholecystitis and cholelithiasis.

3. *Historical landmarks*

Leiomyoma of the uterus.

DR. MALLORY: The necropsy in this case was limited to an examination of the abdomen, so we cannot answer the question about the heart.

She did have cirrhosis of the liver. It was a rather small liver with quite coarse granulations, peculiar in type. I am not certain yet as to the etiology. It was definitely not alcoholic. It was probably what is sometimes called a toxic cirrhosis, that is, the type of cirrhosis that follows mild cases of necrosis of the liver or acute yellow atrophy, if we wish to call it that. I think there is probably no essential difference between acute yellow atrophy and a mild case of central necrosis that we pick up only at post-mortem, except in the amount of liver tissue damaged. Where the acute process does not kill fibrosis follows and we get cirrhosis. This forms a relatively frequent type of cirrhosis, not so common as alcoholic, but perhaps the second commonest type.

The fatal hemorrhage was from the esophageal varices.

The gall-bladder contained one very large stone, and the mass felt behind the uterus was a large fibroid, about eight centimeters in diameter.

DR. CABOT: Did you happen to notice anything about the glands which bothered me?

DR. MALLORY: There were a number of enlarged glands in the mesentery. There is no record of any others. Those were apparently just hyperplastic inflammatory glands with a lot of pigment in them.

CASE 13222

THE OBVIOUS DIAGNOSIS NOT THE
RIGHT ONE

SURGICAL DEPARTMENT

An American brass moulder fifty-two years old entered the hospital August 25, twelve years before his final admission.

Two days before admission he was awakened early in the morning by cramp-like pains starting in the right costovertebral angle and radiating forward to the right lower quadrant. He had chills, fever, and vomiting. After staying in bed for a day he went back to work. That evening he had a sharp onset of cramp-like pain radiating as before and growing more severe.

Twenty years before admission he had some venereal disease with marked swelling of the penis. Otherwise his past history was negative.

Clinical examination was negative except for spasm over the right rectus and tenderness in the right lower quadrant and the right costovertebral angle, most marked at a point in line with the anterior-superior spine at the level of the crest. There was slight tenderness at McBurney's point. The urine showed numerous red blood corpuscles and a quantity of amorphous phosphates.

X-ray showed calcified arteries in the pelvis and a shadow near the lower pole of the right kidney in the course of the ureter. Blood examination showed sixteen thousand leucocytes.

The patient continued to have short attacks of pain in the right flank radiating to the groin and pelvis. These attacks became less frequent. It was decided to let him go home with the understanding that he was to return at once for operation if the pain recurred. September 2 he was discharged unrelieved.

A year after his discharge from the hospital he reported that he had been perfectly well and had had no symptoms of any kind.

He was not seen again until August 2, twelve years after his discharge from the hospital. Then he entered through the Emergency Ward complaining of pain in the right costovertebral angle and the right lower quadrant.

About four months before admission he had an attack of pain similar to the one he had twelve years earlier. The pain was steady, with occasional exacerbations during which it radiated across the back and down the right side into the scrotum. Three days before his readmission the pain moved out of the right costovertebral angle and umbilicus on the right side, from which point it radiated across the abdomen and into the right scrotum. The pain was cramp-like and accompanied by nausea and vomiting. He had had an increase of frequency (9-10 times) with burning micturition since the onset of this acute attack. Twenty-four hours before admission he thought he saw blood in the urine. He had no other symptoms except that since the onset he had noticed increasing dyspnea on exertion, occasional attacks of pain over the precordia and a "tight feeling about the heart."

Examination showed an emaciated old man, pale, anemic looking and apparently older than his years, complaining of dull pain in the right side with acute cramp-like exacerbations radiating across to the left abdomen and into the right scrotum. The breathing was rapid. The skin was dry and atrophic. The teeth were poor. There was marked pyorrhea. The motions of the spine were limited in all directions. The chest was emphysematous. There was fine crackling râles at both bases. The heart was not enlarged. The action was irregular. The sounds were of poor quality. There was a soft

systolic murmur over the entire precordia. The blood pressure was 120/85. The abdomen was soft and seemed tympanitic. There was tenderness but no spasm over the right lower quadrant and slight right costovertebral tenderness. The pupils were normal. The knee-jerks were absent. The urine showed a very slight trace of albumin, 20 to 30 red blood corpuscles and 10 to 15 leucocytes per high power field and rare hyalin and granular casts. Blood examination showed 30,000 leucocytes.

At admission the temperature was 97.8°, the pulse 90°, the respiration 25.

The patient did not seem to be in poor condition except for the weak heart sounds and the systolic murmur. He was sent to the X-ray Department for genito-urinary plates. Just before the plates were taken he went into acute collapse. He was given intravenous glucose and caffeine and was taken back to the Emergency Ward. He was given glucose (1500 centimeters 5 per cent.) and seemed to be in very good condition although weak afterwards. He was left on the shock table. About half past two the morning after admission he suddenly sat up. He had a violent attack of nausea, vomited about twenty-eight ounces of dark brown liquid, went into acute collapse and died.

DISCUSSION

BY EDWARD L. YOUNG, JR., M.D.

This case brings up the points, first, of differential diagnosis between disease of the urinary tract and acute appendicitis, and second, treatment, which here is important.

A single attack of pain such as is described here, although characteristic of renal colic, can be caused by a retrocecal appendix, but if it is a retrocecal appendix the soreness and ache and the sickness caused by the condition will persist. Here he went to work as soon as the pain was over, and it recurred. There is no spasm to suggest peritoneal irritation. Altogether it seems to me that stone in the kidney with renal colic is the right diagnosis, although sixteen thousand leucocytes is a finding which does not ordinarily go with a stone unless that stone has behind it some infection and is causing enough blocking so that there is absorption.

As to treatment, it is true that a stone in the kidney can be present and remain present for a great many years without damage. But it should be taken as a working rule that the presence of stone in the kidney is a potential source of danger and should always be so considered, and the patient should not be lost sight of. In looking up the cases that we have had here in the necropsy records, in 4000 post mortems there were thirty seven cases where stones were present in the urinary tract, discovered when the patient had died of some other condition. Of those only five were free of kidney damage, although twenty-two of the thirty-seven had so little kidney dam-

age that it was negligible. I believe the best working rule is this: if a patient who is known to have a kidney stone is free of pain and free of damage in the kidney as evidenced by a free ureter on cystoscopy and the absence of pus, he can keep that stone so long as he shows no further damage, but he should never be lost sight of.

This X-ray film shows a shadow where it would do the most damage in the urinary tract, that is, in the course of the ureter where it might cause obstruction. I assume he was discharged with a diagnosis of kidney stone.

From the knowledge that we have here it seems hard to fit that sudden death to the diagnosis that we have made, even though that stone had gone on to pretty complete destruction of the right kidney, because it would at least have left the other kidney functioning unless it was a congenitally small kidney such as we occasionally see.

Is it possible that in fact he did have an acute appendix, that the blood and pus in the urine were due to the fact that it was a retrocecal appendix with a periureteritis, and that he now has another attack of acute appendicitis such as a man of this age can have with atypical symptoms, and is now dying of acute peritonitis? I think he has the stone that he had twelve years before, and at this time there ought to be a certain amount of kidney damage.

Twelve years ago there was sufficient arteriosclerosis so that there were calcified arteries in the pelvis, and if he was showing that amount of damage in his cardiovascular system then, it would seem to me that that system might be the cause of his being pale, emaciated, anemic looking and older than his years, and that something went wrong there and caused his death. I should like to ask an opinion as to what one could say on that meager evidence. I do not believe his sudden death was due to either an appendix or a renal condition, although he has a kidney stone and some damage in his right kidney. What would be your opinion, Dr. White?

DR. PAUL D. WHITE: He has had cardiovascular symptoms—dyspnea on exertion, pain over the precordia, and poor heart sounds, a possibly fibrillating heart, although it is not enlarged. There may be coronary disease. On the other hand the description of his collapse and death does not fit in with the story of death from heart failure.

DR. CABOT: I think there is some heart damage, but I do not think he died of it. I think you will find some perfectly definite cause for his death that is not in the cardiovascular system. I should suppose that that vomiting at the end might have some connection with it.

A PHYSICIAN: How about the white count?

DR. YOUNG: Thirty thousand is very high for stone unless he is getting a blocking with a pyonephrotic kidney behind it. The whole thing

may be appendicitis. He may have a recurrence of that. He is sixty-four and in poor shape, and that type of man, at that age, can have a suppurative appendix with peritonitis and very few signs. Of course he may have an entirely separate condition, a malignancy in his gastro-intestinal tract for instance, to which we have no clue. I have no other suggestions.

A PHYSICIAN: A cerebral hemorrhage? That would account for his death and for the white count too.

DR. CABOT: Did you examine the head?

DR. RICHARDSON: No.

DR. CABOT: I think I would like to be recorded as believing that he had general peritonitis.

CLINICAL DIAGNOSIS (FROM HOSPITAL RECORD)

Renal colic.

Myocardial failure.

DR. EDWARD L. YOUNG'S DIAGNOSIS

Stone in the kidney.

Arteriosclerosis.

Appendicitis?

Peritonitis?

ANATOMIC DIAGNOSES

1. Primary fatal lesions

Volvulus and hemorrhagic infarction of the small intestine and hemorrhage into the intestine, the mesentery and the peritoneal cavity.

2. Secondary or terminal lesions

Anemia.

Stone in the pelvis of the right kidney.

Pyelitis, right.

Edema of the lungs.

3. Historical landmarks

Chronic pleuritis.

Slight chronic perisplenitis.

DR. RICHARDSON: A fairly nourished white man. The skin was very pale. The abdomen was not distended and the wall was negative.

The peritoneal cavity contained a large amount, about 1500 cubic centimeters, of bloody fluid. The appendix, esophagus and stomach were negative. The mesentery of the small intestine was long, and at one point was twisted on itself, shutting off a strip of intestine beginning at a point 30 centimeters above the ileocecal valve and extending upward for a length of about 400 centimeters. A group of coils of this portion of the intestine rested over in the right lower quadrant, and another group of coils rested in the pelvic cavity. The wall of the intestine was thickened. The serosa was velvety

blackish red and saturated with bloody fluid, and was regarded as the source of the bloody fluid in the peritoneal cavity. The intestine in this region contained a large amount of bloody fluid. The process in the upper and lower ends of the involved intestine ceased abruptly, and the intestine above and below was negative. The mesentery leading to the involved intestine was markedly thickened, dark to purplish red, and the mesenteric tissue markedly infiltrated with blood-like material.

The portal vein and radicles were frankly negative except that the vessels in the thickened and blood-infiltrated mesentery were injected. The mesenteric arteries were negative.

The large intestine contained a small amount of thin bloody fluid but was otherwise negative.

The mesenteric and retroperitoneal glands were negative.

There were a few old pleural adhesions. No fluid was found in the cavities. The trachea, bronchi, and bronchial glands were negative. The lungs showed no areas of consolidation. The tissues were spongy, pale red, and yielded much thin bloody fluid.

The pericardium was negative. The heart, which weighed 338 grams, had a good myocardium, negative valves and cavities. The coronaries were free and negative. The aorta showed only a slight amount of fibrous sclerosis, and the great branches, so far as I could find, showed no definite arteriosclerosis.

The combined weight of the kidneys was 310 grams. The kidney tissue was frankly negative. The left pelvis and ureter were negative, but in the right pelvis, in the region of the lower pole of the kidney, there was a brownish ovoid stone one and a half centimeters in greatest dimension. The stone was weakly adherent to the mucosa. The pelvis showed but little dilatation. The mucosa showed some dirty reddish discoloration and was coated with a small amount of fibrino-purulent material, and there was a small amount of similar material in the pelvis. The stone rested a little below the opening of the ureter and apparently, at the time, did not obstruct the opening. The ureter was negative except that its upper end contained a little purulent material. The prostate, seminal vesicles, and testes were negative.

DR. YOUNG: I think this case illustrates very well the "will to believe" on the part of the patient and also of the doctors. He had had an attack twelve years before. He had been told that it might recur. Then he had another pain which was pretty diffuse, and he and the doctor thought, "There is the old trouble back again."

DR. CABOT: The will to believe clouded our judgment as well as his. It is very hard not to be fooled in this way. We often speak of how much help the history gives us. Once in a while it leads us astray.

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RECENT ADVANCES IN OTOTOLOGY

It is only within the last few years that the finer details of the histopathology of the middle and inner ear have been demonstrated. Two factors have mitigated against our knowledge of this subject. In the first place, rapid and marked postmortem changes appear early and destroy all the finer normal markings of the labyrinth and its delicate cochlea. Under these conditions it has been practically impossible to separate these changes from those due to pathological processes. This difficulty has been partly overcome by animal experimentation, using intravital fixation of the tissues. A similar method has been used in the case of man by introducing formalin into the carotid arteries very soon after death. By these two procedures, then, it has been possible to obtain fairly fresh material, suitably hardened.

The second technical matter, however, was even more difficult to overcome. This involved the dissection of the specimen, decalcination of the bone, colloidal imbedding, and careful sectioning and staining. All of these difficulties have been overcome by Professor Nager of Zurich, who was the first lecturer on an otological

subject to appear before the Harvey Society. His labors have been of great interest, as he has shown us much of practical importance regarding the ear, and moreover, has pointed the way for further investigation.

He states that the technical difficulties of examining the middle ear are fairly easy to overcome. In spite of his work, however, he was not able to throw any light on the reason for the pneumatization of the mastoid bone. He was, however, able to give us some very practical advice in regard to the formation of cholesteatoma. At first this growth was thought to be due to congenital tumor formation; later to a metaplasia of the mucous membrane of the middle ear. Dr. Nager's investigations, however, point in an entirely different direction. He thinks that cholesteatoma are really due to the epithelization of ulcerated mucous membranes of the external ear. This epithelial new growth invades the middle ear cavity through a marginal perforation of the drum-head. If his theory is correct, our whole attitude towards the problem must be changed.

The newer pathological work has also brought to our attention one of the most tragic of all ear diseases, otosclerosis. This disease is probably a primary constitutional bone disease and has a marked hereditary tendency. So far as can be discovered, it has nothing to do with chronic suppurative of the middle ear. Histology points to an absorption and re-formation of the bone, not dissimilar to that found in Paget's disease.

These findings are most illuminating and ought to lead to further research in this important field of medicine. Apparently the unusual technical difficulties encountered in obtaining microscopic preparations can be overcome.

BOVINE TUBERCULOSIS ERADICATION

THE Department of Agriculture announces that four counties have been added to the list of those free from bovine tuberculosis. These are: Knox County, Indiana; Hartnett County, North Carolina; Laurence County, Pennsylvania; and Shelby County, Tennessee. In addition to these complete counties, parts of three counties in Vermont have been recognized as modified accredited areas. These areas are the part of the county of Washington, included in the town of Berlin; the part of Lamoille County included in the town of Johnson; and the part of Caledonia County included in the town of Peacham. Stanley and Stokes Counties in North Carolina and Glin County in Indiana have been reaccredited for an additional three years.

Slowly but surely the movement for bovine tuberculosis eradication by Federal accreditation is progressing. Whether or not a tuberculosis free cattle population for the entire country can be built up is still a matter of con-

jecture and will take many years of persistent effort before accomplishment. Every area that is accredited means a new source of reliable milk, at least so far as the danger from tuberculosis is concerned.

ECONOMIC FACTORS AFFECTING THE ORGANIZATION OF MEDICINE

IN 1926 a conference was held in Washington to consider the subject set forth in the above caption. There were in attendance at this conference, Lewellys F. Barker (Chairman), Baltimore, Maryland; H. S. Cumming, Surgeon General U. S. Public Health Service, Washington, D. C.; Michael M. Davis, Executive Secretary Committee on Dispensary Development, New York, N. Y.; William T. Foster, Director Pollak Foundation for Economic Research, Boston, Mass.; Walton H. Hamilton, Professor of Economics, Brookings Graduate School of Economics and Government, Washington, D. C.; Harry H. Moore, U. S. Public Health Service, Washington, D. C.; Harold G. Moulton, Director Institute of Economics, Washington, D. C.; W. S. Rankin, Director, Hospital and Orphans Sections, the Duke Endowment, Charlotte, N. C.; W. C. Rappleye, Director of Study, Commission on Medical Education, New Haven, Conn.; Winford Smith, Superintendent, Johns Hopkins Hospital, Baltimore, Md.; A. M. Stimson, Assistant Surgeon General, In Charge of Division of Scientific Research, U. S. Public Health Service, Washington, D. C.; Edgar Sydenstricker, Statistician, U. S. Public Health Service, Washington, D. C.; L. R. Thompson, Surgeon, In Charge of Office of Industrial Hygiene and Sanitation, U. S. Public Health Service, Washington, D. C.; C.-E. A. Winslow, Professor of Public Health, Yale University, and President American Public Health Association, New Haven, Conn.

The following questions were discussed: To what extent is the prevailing opinion correct that the cost of medical service has greatly increased in recent years?

What is the relaxation of the cost of medical care to the family budgets of various income groups?

What changes have taken place in the absolute and relative amounts of the various elements in the cost of care of sickness, i. e., medical fees, surgical fees, consultation fees, expenses for laboratory, X-ray, nursing and medicines, and for hospital and clinic charges?

To what extent and in what manner could the cost of one or more of these elements be reduced without injury to the patient or to the medical profession?

In view of the greatly increased expense for the equipment necessary for complete and adequate medical practice, is it fair to expect the individual physician to provide this capital, or

should the provision of the capital be a responsibility of the public through governmental or through volunteer organization?

How may hospital charges be reduced or hospital policy altered so as to provide more fully for patients of moderate means?

If clinics can be efficient and economical means of providing medical service for ambulatory patients, why should there be clinics for the poor and rich, but hardly any for the majority of the population?

Should the development of hospitals and clinics as proprietary institutions be encouraged?

To what extent may the utilization of state and municipal diagnostic laboratories by private physicians reduce the cost of medical service?

According to what principles should proposals to restrict or to extend the functions of the state in the field of public health and medical care be judged?

To what extent do the financial and social policies which have been established in education, as in public or private schools, colleges and universities, serve as a guide to developments in the field of medical service?

The discussion of these questions demonstrated that many economic problems in medicine demand study, and a committee of five was appointed to study all matters relating to these problems and "propose plans for the creation of an organization which would be responsible for the conduct of researches by various interested agencies." This committee consisted of:

Winford Smith, Chairman; Michael M. Davis, Walton H. Hamilton, C.-E. A. Winslow, Lewellys F. Barker, H. H. Moore, Secretary.

Several meetings have been held by this committee and invitations were issued for another conference which was held in Washington, May 17, 1927. The program was as follows:

FIRST SESSION

American Red Cross Building
9:30 A. M.

Chairman—Ray Lyman Wilbur

I—The Inability of the People to Pay the Cost of Modern Scientific Medicine.

The Cost of Modern Medical Service, Louis I. Dublin.

The Income of the People, Leo Wolman.

Some Results of Inadequacy of Income, C. C. Pierce.

Discussion led by J. Shelton Horsley, Michael M. Davis.

II—Other Evidences of Maladjustment in the Organization of Medicine, Haven Emerson.

Discussion led by Walton H. Hamilton, W. C. Rappleye.

III—Some Recent Attempts to Provide More Adequate Medical Service, W. S. Rankin.

Discussion led by John Sundwall, A. T. McCormick.

The "Health Demonstration," John A. Kingsbury.

Discussion led by William Darrach.

SECOND SESSION

Luncheon at the Washington Hotel
1 P. M.

Chairman—Lewellys F. Barker

IV—The Revised Report of the Committee of Five,
Winford H. Smith.

Discussion by Conferees, led by C.-E. A. Winslow.

Some of the important facts presented by the speakers were that, although sickness sooner or later affects everybody thereby imposing heavy burdens, comparatively little attention has been given to its economic importance although the Bureau of Labor and Industry had shown that in the study of certain groups the average annual expense per family amounts to as high as eighty dollars, and the proportion to the family income may be as high as five per cent; that since there are twenty-seven million families in this country the expense may amount to at least three billion dollars; of this the cost of medical service may be from forty to fifty per cent; hospital charges may be ten per cent. This last item is growing larger because hospitals are becoming a common refuge for larger groups of people. Studies of the income of groups show that since 1918 the cost of illness has increased faster than the relative earning capacity of the people, varying to a considerable extent in different sections. Although the figures which have been worked out undoubtedly contain some errors, it is considered fair to estimate the average yearly cost of illness per family to be in excess of sixty dollars per year. It appears to be clearly in evidence that twenty-five per cent. of the people find the expense of illness a burden too heavy to be met by the family income.

In addition to the financial aspect of medical service, other matters are of equal importance such as the quality of service rendered, for it is believed that inadequate medical service due to several causes is responsible for poor results and even death. As examples, reference was made to the omission of prenatal care and lack of suitable equipment of the physician as contributing to the mortality rate. The disproportionate remuneration of experts as compared with the family physician is a matter for careful consideration.

The failure of the average doctor to employ routine examinations among his patients and even in his own family was referred to as an illustration of the lack of attention to his obligations. The doctor is blameworthy if he does not ally himself with all the agencies engaged in public health activities. The working man who is well is better able to pay for health examination, and perhaps prevent illness, than meet the cost of sickness after his income has been stopped.

So far as the future supply of doctors is concerned, it was shown that although only twenty

per cent. of the practitioners of today are not specialists or part specialists, the future doctors will be more generally engaged in special kinds of work and that rural communities will have fewer doctors because the most remunerative work even in smaller places is going to the specialists, and more doctors are taking on public health and institutional work. Fifteen per cent. of recent graduates are now having full time salaries, in positions which take them out of general practice and some doctors over sixty-five years of age will soon be lost to the smaller places and their places will not be filled. The proportion of graduates in medicine to the population is growing smaller.

The cost of medical care in colleges and secondary schools under the care of well-trained physicians was referred to as a type of economic service and productive of good results from an epidemiological point of view. The importance of regular physical examinations was referred to as having for its great purpose the early detection of trouble and timely warning, but since it is so much neglected the question of compulsory attention to this important study was suggested, for its value has been demonstrated when employed in groups of students.

The custom of so called health demonstrations as often conducted was not endorsed by some of the speakers.

The morning session was especially important as leading up to concrete action after the luncheon. It was evidently meant to show the great variety of problems confronting the medical profession.

In the afternoon Dr. Barker referred to the recommendations of the committee amplifying the recommendations suggesting that a permanent committee be created which should be a fact finding committee empowered to employ competent investigators and recommended the raising of a fund of forty thousand dollars for the use of the committee. He reported the receipt of a telegram from the Twentieth Century Fund of Boston making a contingent offer of twenty thousand dollars.

After a short general discussion, it was unanimously voted that the temporary committee of five be authorized to expand its membership to eighteen and enter upon the work outlined in its report as explained by Dr. Barker.

This movement gives promise of ascertaining facts which can be used by various organizations in bringing order out of the present chaotic and undeveloped public health programs, many of which are overlapping or duplicating and also clarify the disturbing conditions confronting the medical profession.

The Massachusetts Medical Society

THE ANNUAL MEETING

ALTHOUGH the JOURNAL in its issue of May twenty-six has especially featured the Annual Meeting of the Massachusetts Medical Society which will be held June sixth, seventh, and eighth, and the Secretary has sent a program to every member, there may be some who have not taken time to carefully read all that has been set forth.

The Committee of Arrangements has perfected plans which will present more educational features than has been customary. It should be realized that for the first time in the history of the Society three days instead of two will be devoted to the business and scientific programs.

In response to the wishes of those living at a distance from the capital of the State, the annual dinner will be served at two o'clock on Wednesday instead of in the evening. This plan will permit leaving the city in time to reach home on that day.

There has been a growing interest in the affairs of the Society in recent years and in addition a very general feeling of cordiality and coöperation among its members. The Committee of Arrangements is especially desirous of having the spirit of good-fellowship a prominent feature of these meetings. It is hoped that the reticence which the stranger sometimes exhibits in his visit to a place with which he is not familiar (if this applies either to the visitor or to Boston) will give way to spontaneous cordiality and that requests for assistance or information will give those who are at home in the city the privileges of camaraderie. Boston is not as cold as has been sometimes pictured.

We trust that the coming meeting will be the biggest and best in the history of the Society and that those who will have been kept at home will know that they have missed a valuable experience.

Don't stay at home unless it is really necessary.

THIS WEEK'S ISSUE

CONTAINS articles by the following authors:

WHITE, JAMES C., A.B., M.D. Harvard Medical School 1923, Resident Surgeon Massachusetts General Hospital. Address, Massachusetts General Hospital, Boston. Associated with him is

BRIDGE, EDWARD M., B.E., M.D. Harvard Medical School 1926, House Officer Massachusetts General Hospital. They write on "Loss of Chloride and Water from the Tissues and Blood in Acute High Intestinal Obstruction—An Experimental Study on Dogs with Duodenal Obstruction." Page 893.

TUTTLE, HOWARD K., M.D. Tufts College Medical School 1907. F.A.C.S.; Assistant Chief of Surgical Clinic, The Ancon Hospital, Ancon, Canal Zone. His subject is "Appendicitis, A Review of 3285 Cases." Page 897.

PAINE, A. K., M.D. Tufts College Medical School 1902. F.A.C.S.; Associate Professor of Obstetrics Tufts College Medical School, Assistant in Gynecology, Courses for graduates Harvard Medical School, Surgeon-in-Chief Department Diseases of Women, Boston Dispensary. His subject is "Backache in Women, From the Standpoint of the Gynecologist." Page 902. Address, 80 Bay State Road, Boston, Mass.

KIERNAN, J. A., V.S., Chief of Tuberculosis Eradication Division U. S. Bureau of Animal Industry. His subject is "Livestock Diseases Affecting Public Health." Page 907. Address, U. S. Bureau of Animal Industry, Washington, D. C.

SMITH, MRS. MABEL G., Executive Secretary Cambridge Anti-Tuberculosis Association. Her subject is "Historical Outline Cambridge Anti-Tuberculosis Association." Page 913. Address, Cambridge, Mass.

MISCELLANY

LAW FOR STERILIZATION OF DEFECTIVES UPHELD

STERILIZATION of a feeble-minded white woman who had been committed to the Virginia State Colony for Epileptics and Feeble-Minded and who is the daughter of a feeble-minded mother in the same institution and the mother of an illegitimate feeble-minded child was held to be permissible under the Federal Constitution by the Supreme Court of the United States in an opinion handed down May 2.

The case was brought before the Supreme Court of the United States upon the theory that the statute authorizing the judgment is void under the Fourteenth Amendment as denying to the plaintiff in error due process of law and the equal protection of the laws.

The Act of Virginia, approved March 20, 1924, states that the health of the patient and the welfare of society may be promoted in certain cases by the sterilization of mental defectives, that the sterilization may be effected without serious pain or danger and that the sterilization of such individuals will relieve the Commonwealth of the burden of supporting such defectives who if released would be a menace to the community. It further recites that if sterilization is effected, defectives may in many instances be released without danger to the community and may become self-supporting with benefit to themselves and to the community.

With regard to the procedural methods for protecting the rights of the individual, the court said in its opinion, rendered by Mr. Justice Holmes:

"There can be no doubt that so far as the procedure is concerned the rights of the patient are most carefully considered, and as every step in this case was taken in scrupulous compliance with the statute and after months of observation, there is no doubt that in that respect the plaintiff in error has had due process of law."

The judgment upon which the order of sterilization was based found that the plaintiff in error "is the probable potential parent of socially inadequate offspring, likewise afflicted, that she may be sexually sterilized without detriment to her general health and that her welfare and that of society will be promoted by her sterilization."

In affirming the judgment of the court below, the Supreme Court said: "It is better for all the world, if instead of waiting to execute the degenerate offspring for crime, or to let them starve for their imbecility, society can prevent those who are manifestly unfit from continuing their kind."

"The principle that sustains compulsory vaccination is broad enough to cover cutting the Fallopian tube. Three generations of imbeciles are enough."—*U. S. Daily*.

CORRESPONDENCE

CORRECTION

Editor, Boston Medical and Surgical Journal:

In my article upon "Autopsies upon Jews and Gentiles" I regret that in the proof I overlooked an error on page 729. Instead of "on" it should read "no," and the sentence would therefore be: "They would do well to cite the article of Dr. Gottlieb in which he has convincingly shown that the Jewish law and religion put no ban upon a post mortem examination."

Very truly yours,
ELLIOTT P. JOSLIN.

1927 LEGISLATIVE RETROSPECT

Massachusetts College of Osteopathy
Established 1897 Chartered 1898
415 Newbury Street
Boston 17, Massachusetts

May 4, 1927.

My dear Doctor:

The Massachusetts Legislature is prorogued.

All legislation, either nearly or remotely affecting osteopathy, has been taken care of to our satisfaction, and to all members of the profession and their patients who have contributed to these results, I convey the thanks of the Massachusetts College of Osteopathy.

Senate Bill 1, that portion of the Governor's recommendation giving the State Board arbitrary power over schools, had the unanimous support of the members of the Board and was advocated by the powerful lobby of the State medical profession, backed by all the resources of the Massachusetts Medical Society

and the American Medical Association. The bill was killed in the Committee.

Senate Bill 252, asking for a separate chiropractic board of registration, was approved by the Committee on Public Health. It was passed by the Senate and sent to the House, where it was amended, sent back to the Senate and passed to be referred to the Committee on Ways and Means. Here amended and approved, it returned to the Senate, was passed, sent to the House, and was defeated.

This bill was the object of the most spectacular fight of the session, and we cannot but say that it was a moral victory for the chiropractors. It was opposed with the utmost vigor by the Massachusetts Medical Society, and it appeared that the greater their opposition the farther the bill was advanced. When it appeared that the bill would become a law, we decided to take a hand, and its defeat is ascribed by many to osteopathic influence.

The close of the session leaves the handful of leaders of the allopathic profession, indeed, looking sick. The futility of the efforts of this section of the powerful medical trust can only be ascribed to its poor leadership, its lack of sincerity, and loss of faith in its leaders by the rank and file of the medical profession.

After many years of careful study of osteopathic laws and of the workings of separate and of mixed Boards of Registration, the principle of separate boards so ably set forth by Dr. Asa Willard is now rapidly gaining ground. The camouflage "single standard" phrase is meaningless and is nothing compared with "adequate protection of the public" by honest examinations conducted by experts of that school from which the applicant graduates. We expect to see osteopaths registered by osteopathic examiners instead of by homeopaths and allopaths.

Fraternally yours,

GEORGE W. GOODE, D.O., *President*.

EDITORIAL NOTE:—The circular which appears above was forwarded to this office by a member of the Massachusetts Medical Society. It is not felt that any comment is needed.

NAPOLEON'S ANATOMY LESSON

Mr. Editor:

The following account of Napoleon and Corvisart is taken from "The Life and Memoirs of Count Molé, 1781-1855" (New York, George H. Doran Company, 1924).

Mathieu Louis Molé was the son of Edouard François Mathieu Molé, Count de Champlatreux who, "Mounted the scaffold raised in the name of human liberty and fraternity, and died at the age of thirty-four, leaving behind him a widow and three children of tender years, two girls and a boy."

The frightful sights of the Revolution, and his father's execution left indelible imprints upon this boy's mind, which he carried with him all his life.

"Under the influence of his great family memories, he felt that he had a duty towards his country and decided to address himself to public affairs. Without in any way denying the greatness of the past, he took service under the new regime."

"His new post brought Count Molé into almost daily touch with Napoleon. The latter liked his company, enjoying talking to him, often took him with him when he was moving about and when circumstances prevented him from having Molé with him, he ordered him to write, so that the talk could continue."

September 29, 1809, Molé writes, "I was calling at Malmaison one day, the Empress had told me that the Emperor had wanted to have an anatomy lesson: he told Corvisart secretly to bring him parts of the human body to dissect them in his presence."

"For this purpose he shut himself up in his study

with Corvisart before lunch. The Empress knew nothing, but she noticed that the Emperor was paler than usual, and could not eat. She asked the butler, who first pledged her to secrecy, and then told her of the anatomy lesson. She immediately sent for Corvisart and told him of the Emperor's condition. Corvisart refused to go on with the dissection. 'And the Emperor,' added the Empress, 'subsequently thanked me.'

Very truly yours,
WM. PEARCE COUES, M.D.

May 21, 1927.

VACCINATION AND EDUCATIONAL INSTITUTIONS

Mr. Editor:

What Dr. Worcester has induced the corporation overseers and numerous faculties of Harvard University to do about vaccination is indeed enough of itself to justify his appointment as professor of hygiene on the Oliver foundation.

The vote apparently requires a certificate satisfactory to him, saying nothing about sworn statements that given individuals are not proper subjects for the procedure.

It is undoubtedly true, as aggressively stated at the last legislative hearing on the subject by the attorney for the Antis, that thousands (or possibly hundreds) of unvaccinated children are now in the public schools, but this gentleman who boasted that his children were there, that they never had been vaccinated and never would be, must now add Harvard to Smith, Wellesley and Mt. Holyoke as places where he cannot send them to complete their education.

Nor is in my opinion the day too far distant when no college in the State will accept these unprotected and potentially dangerous individuals within their gates.

What the University of California, a State university, has just fought through the courts can of course easily be provided for by our privately managed institutions of higher learning, and we need at each of them but a physician of the Worcester type to raise his voice and use his influence to put that greatly to be desired regulation into effect. Amherst, Williamstown, Boston and Worcester physicians take notice.

Sincerely,
SAMUEL B. WOODWARD.

EXPERIENCE WITH THE GRAHAM TEST

Grace Hospital
New Haven, Conn.

May 23, 1927.

Editor, *Boston Medical and Surgical Journal*:

So much emphasis has been laid upon the necessity and importance of a suitable enteric coating for the successful application of the Graham test when administered orally, both by roentgenologists and chemical houses, that I thought it might be of interest to report my experience with this test.

Inadvertently at first and then with deliberate intent I have examined ten cases of suspected gall bladder disease with Mallinckrodt's Iodikon ampoules, exhibiting the fresh powder in plain gelatin coated capsules which have had no other coating, all

of which were presumably dissolved in the stomach, at least there were no undissolved capsules at the examination. They were given in doses of three capsules at a time and were repeated every fifteen minutes, the entire dose being taken within an hour. With each dose there was given a quarter of a teaspoonful of bicarbonate of soda and a quarter of a glass of water. The usual procedure was followed of partaking of a rather fatty meal at supper time, and the capsules begun two hours later.

In no case was there any gastric or intestinal disturbance reported or complained of, and particular effort was made to bring out any such reaction by careful questioning. The shadow obtained in the normal cases compared favorably with the shadows obtained after taking capsules having an enteric coating. I think it is quite possible that the exhibition of the alkaline salt with each dose may have helped to obviate the gastric irritation by tending to neutralize the gastric acidity.

This communication is not intended as an argument against the use of enteric capsules, nor to favor the use of plain gelatin coated capsules, but simply to call attention to the apparently exaggerated emphasis laid upon the necessity of preventing the dye from coming in contact with the gastric mucosa.

Very truly yours,
LOUIS F. WHEATLEY, M.D.
420 Temple Street, New Haven, Conn.

NEWS ITEMS

HARVARD MEDICAL SCHOOL NEWS ITEMS—Resignations—Dr. Edward Allen Boyden, Assistant Professor of Comparative Anatomy, resigned last summer to become Associate Professor of Anatomy at the University of Illinois.

Dr. Raphael Isaacs, Instructor in Medicine, is to be assistant director of the Thomas Henry Simpson Institute for Medical Research.

Oliver Ames Lothrop, M.D., Instructor in Otology. Clements C. Fray, M.D., Assistant in Psychiatry. Edwin Scott Goodwin, M.D., Assistant in Pediatrics. Ralph Augustus Hatch, M.D., Assistant in Ophthalmology.

Lewis M. Hurxthal, M.D., Research Fellow in Medicine.

Joseph Andrew Johnston, M.D., Assistant in Pediatrics.

Vernon P. Thompson, M.D., Teaching Fellow in Orthopedic Surgery.

Leaves of Absence—Dean Edsall has returned to the Medical School after six months' leave of absence. He has been at the Peking Union Medical College as visiting Professor of Medicine, and making some general surveys of the school.

Dr. Edward Delos Churchill, Instructor in Surgery, is abroad on a Moseley Traveling Fellowship, and has visited surgical clinics in England, France, Switzerland, Austria, Czechoslovakia and Germany, spending most of his time in clinical observation and pathological work in Sauerbruch's Clinic in Munich.

Dr. Frank Fremont-Smith, Assistant in Neuropathology, is abroad with his family for a year on a Moseley and Rockefeller Traveling Fellowship. He went first to the Physiological Congress at Stockholm and then to work under Professor Tannhauser at Heidelberg, where he expected to stay until February and to work on edema. He then goes to Paris and will spend six months, approximately, with Mestrezat, working on spinal fluids.

An expedition to study diseases in Africa, and to

throw light on little known forms of life, left on May 15, headed by Dr. Richard P. Strong, head of the Department of Tropical Medicine and director of the Institute of Tropical Medicine, Harvard University.

Other members of the expedition are: Dr. Joseph Bequaert, Assistant Professor of Entomology, formerly with the Belgian Sleeping Sickness Commission, with eight years' service in the Congo; Dr. Glover M. Allen, zoologist, author of special studies in East Africa on mammalian life; Dr. George C. Shattuck, Assistant Professor of Tropical Medicine, a participant in the Amazon expedition and, before that, on the typhus investigation in the Balkans; Dr. Max Theiler, bacteriologist, son of Sir Arnold Theiler, of South Africa, formerly of the London

School of Tropical Medicine; Dr. Harold Coolidge, zoologist, formerly with the Smithsonian Institution; Mr. Loring Whitman, photographer, and Dr. David H. Lindner, botanist.

They spent the summer and fall in Liberia, where they made the first medical and scientific survey ever made of the interior of Liberia. They proceeded up the Congo and are now in British East Africa. They plan to come back in the middle of the summer by way of Suez.

New Dormitory—It is expected that the new dormitory, with a capacity for 252 students, will be ready for occupancy next September. The plans for assignment of rooms, methods of conducting the dormitory, etc., are now being matured and will soon be in condition to announce.

DISEASE INCIDENCE IN CONNECTICUT
WEEK ENDING MAY 14

DISEASE	1927					1926			
	Week ending Apr. 23	Week ending Apr. 30	Week ending May 7	Week ending May 14	Average cases reported for week corresponding to May 14 for past 7 yrs.	Week ending Apr. 24	Week ending May 1	Week ending May 8	Week ending May 15
Actinomycosis	-	-	-	-	-	-	-	-	-
Anthrax	1	-	-	-	-	-	-	-	-
Botulism	-	-	-	-	-	-	-	-	-
Cerebrospinal Menin.	1	-	1	-	-	-	1	1	1
Chickenpox	44	78	112	96	50	36	44	61	63
Conjunctivitis Inf.	1	-	1	-	2	-	1	1	-
Diphtheria	51	26	28	20	43	13	19	25	16
Dysentery, Amoebic	-	-	-	-	-	-	-	-	-
Dysentery, Bacillary	-	-	-	-	-	-	2	-	1
Encephalitis Epidemic	1	-	-	-	-	-	1	1	1
Erysipeloid	-	-	-	-	-	-	-	-	-
Favus	-	-	-	-	-	-	-	-	-
German Measles	11	17	34	10	25	21	10	121	43
Hookworm Infection	-	-	-	-	-	-	-	-	-
Influenza	1	3	4	3	5	269	20	9	12
Leprosy	-	-	-	-	-	-	-	-	-
Malaria	-	1	1	-	-	-	-	1	-
Measles	58	50	51	58	270	571	726	711	522
Mumps	36	53	45	36	40	11	6	9	9
Paratyphoid Fever	-	1	-	-	-	2	-	-	-
Pneumonia, Broncho*	38	26	26	34	9*	50	63	42	49
Pneumonia, Lobar	55	44	75	34	30	60	69	54	49
Polio-myelitis	-	1	-	-	-	1	-	-	-
Scarlet Fever	106	99	103	105	90	81	89	78	95
Septic Sore Throat	2	6	3	3	-	1	1	-	-
Smallpox	-	-	-	-	-	-	-	-	-
Tetanus	-	1	-	-	-	1	-	-	-
Trachoma	-	-	-	-	-	-	-	-	-
Trichinosis	-	-	-	-	-	-	-	-	-
Tuberculosis, Pul.	22	39	35	38	35	33	41	24	31
Tuberculosis, (o.f.)	2	7	6	6	2	8	7	-	-
Typhoid Fever	-	1	1	-	4	1	1	3	-
Typhus Fever	-	-	-	-	-	-	-	-	-
Whooping Cough	20	31	60	67	64	50	39	55	54
Gonorrhoea	47	8	20	15	20	9	5	21	14
Syphilis	32	14	16	12	30	8	9	31	26

*Average for two years. Made reportable January 1, 1925.

Remarks: No cases of cholera, Asiatic, glanders, plague, rabies in humans and yellow fever during the past seven years.

OBITUARY

RALPH WENTWORTH JACKSON, M.D.

THE JOURNAL chronicles with great regret the death in Washington, D. C., on May 23, 1927, from heart disease, of Dr. Ralph Wentworth Jackson, of Fall River, eminent proctologist, counselor and vice-president—1924-1925, of the Massachusetts Medical Society. Dr. Jackson had attended the annual meeting of the American Medical Association, being a member of the executive committee of the Section on Gastroenterology and Proctology, a former chairman of that section. He was stricken with a heart attack on May 21, after the close of the session, having had a similar attack a year ago. Pneumonia developed almost immediately. His wife was summoned from Fall River and arrived forty-eight hours before he passed away at the Garfield Hospital, where he had been taken when first seized by his fatal malady.

The only child of John H. and Clara Wentworth Jackson, he was born in Waterville, Maine, May 13, 1868. Coming to Fall River as a child he attended the public schools, graduating from the B. M. C. Durfee High School in 1885 and entering Brown University in that year. There he received the degree of A.B. in 1889, being a member of the Phi Beta Kappa Society. Going on to the Long Island College Hospital in Brooklyn, he took his M.D. in 1892 and returned to Fall River to practise. He devoted himself largely to the specialty of diseases of the rectum and held the positions of proctologist to the Fall River General Hospital, the Union Hospital of the same city, St. Luke's Hospital, New Bedford, and to the Carney Hospital, South Boston. At the last institution he gave clinics twice a week. In 1924 Dr. Jackson was president of the American Proctologic Society, and, at the same time, vice-president of the Massachusetts Medical Society. He was a Fellow of the American College of Surgeons and a member of the Fall River Medical Society. He held membership in the Delta Phi fraternity, King Philip Lodge of Masons and the Rod and Gun Club. He was an approachable man, was possessed of unusual executive ability and had a host of friends.

In 1896 Dr. Jackson married Gertrude Pearson, daughter of Dr. William Pearson of Fall River. She and a son, Eric Pearson Jackson, an instructor in advanced geography at Hillsdale College, Michigan, survive him.

NOTICE

REMOVAL

DR. JAMES J. DUFFY has moved his office to 350 Park Avenue, New York City.

REPORTS AND NOTICES OF MEETINGS

MEETING OF THE BOSTON HEALTH LEAGUE

A MEETING of the Boston Health League will be held at the Twentieth Century Club, 3 Joy Street, Boston, on Wednesday, June 8, at 4 P. M.

Dr. George H. Bigelow, Commissioner of Public Health for Massachusetts, will speak on: "The State Cancer Program."

Members of the medical and nursing professions are cordially invited.

ESSEX COUNTY HEALTH ASSOCIATION, INC.

A LARGE number of physicians, nurses and interested persons were present on May 11 at the third annual meeting of the Essex County Health Association at the Middleton Sanatorium. A supper was held at 6:30, following which Dr. Olin S. Pettingill, who was re-elected president of the organization, delivered an interesting address on the progress of the work in the county.

The following officers were re-elected: President, Dr. Olin S. Pettingill of Middleton; Vice-President, Dr. Walter G. Phippen of Salem; Hon. Vice-President, Dr. Israel J. Clarke of Haverhill; Treasurer, Mr. J. Edwin Austin of Salem; Field Secretary, Miss Cora L. Cooke of Beverly.

The board of directors appointed were as follows: Mrs. Thomas L. Jenkins, Topsfield; Mrs. Otis Ray, West Newbury; Mrs. H. S. Pearson, Miss Helen Wales and Willard Publicover, Beverly; Mrs. E. Maud Page, Lynnfield; Mrs. John Everett and Mrs. Arthur Duhamel, North Andover; Mrs. Chas. D. Thompson and Mrs. Irving Southworth, Andover; Mrs. Clara P. Bell and Mrs. Mary F. Young, Danvers; Miss E. Frances Blanchard and Mrs. Frank W. Roberts, Peabody; Miss Amy B. Lindsey and Dr. Jane S. Devereaux of Marblehead; Mrs. T. Joseph McAuliffe and Mrs. H. G. Hamann of Swampscott; Mrs. Edith B. Dresser, Georgetown; Mrs. T. Frank Waters, Ipswich; Mrs. Abbie May Roland, Nahant; Mr. H. W. Pritchard, Newbury; Mrs. H. A. Thomas, Hamilton; Miss Betsey P. Curtis and Dr. P. C. Proctor, Gloucester; Dr. Elmer S. Bagnall, Groveland; Mrs. A. E. Heald, Methuen; Mrs. Emily B. Smith, Amesbury; Mrs. William Follett, Manchester; Mrs. Benjamin Brown, Middleton; Mrs. David O. Mears, Essex.

The executive committee for 1927 and 1928 will consist of Mrs. Edith B. Dresser, Josiah H. Gifford, Miss Helen Wales, Mrs. T. Joseph McAuliffe and Dr. Thomas L. Jenkins.

Following the meeting a health entertainment was given by children of the Sawyer School of Gloucester.

ANNUAL REPORT OF THE SECRETARY

May 11, 1927

Each year, according to custom, we pause in our daily work and look back on the picture of this year's work as a whole. We ask ourselves: "What have we accomplished in our service to the community?" Disraeli once said: "Public Health is the foundation upon which rests the happiness of the people and the welfare of the State." It is the object of such associations as ours to contribute at least some small part towards the building and strengthening of such a foundation.

With an organization of this kind, the keynote of whose whole program is education, it is difficult to measure results with any degree of accuracy.

A report of the work naturally falls under five headings: Summer Health Camp, Follow-up Work, Child Health Educational Work, Christmas Seal Sale, Publicity and Other Activities, and will be taken up in the order named.

SUMMER HEALTH CAMP

The Summer Health Camp is one concrete part of our program, certain results of which we can definitely measure. The clinics which have been conducted the past few years by the State Department of Health have given much information about the physical condition of the children of school age. Malnutrition, a prominent menace to child health is prevalent and there is a little doubt regarding its seriousness. From 8 to 10% of the school children have been found to require special supervision and care to return them to average health and safety. To be sure not all of these children require identical remedial measures but there is a group of children whose condition requires not only the examination and advice of the skilled medical man, but also removal from home influences and routine and a training in a new order of daily living. The more serious cases in this group can best be taken care of at properly conducted Preventoria such as we have at Westfield and North Reading. A large number of these children, however, can be given eight weeks of camp life with results which show a very worth while improvement in physical condition.

It is this group of children who are not actively sick but who are underweight and who come from families where they have been exposed to tuberculosis that the Middleton Health Camp is conducted for. In order that they may be free to gain we ask that they have all remedial defects such as diseased tonsils, decayed teeth, etc., taken care of before they are admitted. They must bring with them a certificate from a physician stating that they are free from contagious disease.

During the entire camp season of eight weeks the health of the children is under the supervision of Dr. Pettigill who examines each child on admission and again before discharge if their condition warrants it.

The camp personnel, which is very carefully selected, consists of a Supervisor, who is a graduate nurse, one counsellor to every ten children, a cook and a handy man. The counsellors are selected for their ability to act as leaders of children and for work in which they have had special training, i. e., posture work, reed work, basketry, nature study and handicraft work. Camp life must be varied and comprehensive, providing not only for the physical betterment but also for the mental and moral betterment of the child.

During the camp season of 1926, fifty children were cared for, the following nationalities being represented: American, English, Scotch, Canadian, French, Irish, Jewish, Polish and Austrian. The average gain was 6.9 lbs. the highest individual gain for the girls being 16½ lbs. and for the boys 11½ lbs. Seven children were X-rayed and ten were

given an examination by the Sanatorium dentist. One child was taken to the Lawrence General Hospital for a tonsil operation. The individual corrective exercises and group posture work resulted in marked posture improvement in many cases.

These are the measurable results of camp life but we strongly believe that there are other far reaching results. Take for instance the case of twelve-year old Agnes who wrote: "I have tried hard to pay my dues and do as near the right as I could, I have gained five pounds since I was at Camp. (Dec. 29). My mother says I am a new girl I have changed so. I am never cross now and I am not nervous." And further on in the letter she says: "I enjoyed My Camp life and I hope I get another chance to go again next summer." I believe this girl gained something besides weight during her stay at Camp.

FOLLOW-UP WORK

For the camp work to be thoroughly effective the children must be followed up after they leave camp. During the camp period the Director talked with practically all of the parents individually and one talk was given to the parents as a group. A report of each child's condition was sent to the school nurses and chairman in each town at the close of camp and a suggestion made that we should be glad to receive any reports of the child's progress during the winter.

To date we have had reports from 45 of these children, 28 of whom have been visited by your Secretary. Three have been re-examined at the Essex Sanatorium—two of these were found to be improved, the third was unimproved and Preventorium care advised. One other child examined at a local dispensary was found to be unimproved and Preventorium care was recommended for this child who is now at Westfield. Two other children have been reported unimproved. Thirty-eight have been reported as improved. In Beverly the seven camp children are continuing their corrective exercises in a posture class being carried on under the direction of Miss Weir of the Board of Health.

Replies to questionnaires sent out during the summer of 1926, regarding children who were at camp in 1925, showed that thirty-three children were improved, three unimproved, four at Westfield Sanatorium and seven at camp again in 1926. Twenty-nine of these children had had a complete physical examination during the year. These questionnaires brought out the fact that excellent follow-up work is being carried on in some towns but there is still need for much more intensive work in other places.

CHILD HEALTH EDUCATIONAL WORK

Through the agency of the schools we are endeavoring to stimulate an interest in health work. Since the teacher is the one who comes in closest contact with the children we have centered our efforts on giving to the teachers suggestions and material which would be of practical use in this work. Talks have been given to groups of teachers explaining the material which is available for their use and also showing samples of work which has been done by other teachers. Ninety teachers have been reached in this way. In several of these towns the Modern Health Crusade (a picturesque method of teaching health habits to children) is being carried on. In Peabody a very interesting demonstration of Crusade work was given recently by the children of three schools.

There is much more that might be done in this field of work. It is unfortunate that, due to the stress of the many details of Seal Sale work, very little time can be given by the Secretary to this work during the first few months of the school year.

CHRISTMAS SEAL SALE WORK

I am pleased to report that the gross receipts from the Christmas Seal Sale this year totaled \$11,000—an

increase of \$1,000 over last year. Our expenses this year, however, were considerably greater due to the fact that we added about 4,500 new names to our card catalog. The 50% returned to towns having local committees is to be used in sending children to camp, for dental clinics, for school lunches, for nutrition work and for health educational material and purchases of scales in the schools. The five leading towns in Seal Sale returns were Manchester, with a per capita rate of .15; Hamilton & Wrenham, .109; Nahant, .096; Topsfield, .095 and North Andover, .09. The average per capita rate for the County was .064. The success of the Seal Sale has been largely due to the splendid efforts of the local committees.

PUBLICITY AND OTHER ACTIVITIES

The publicity work has been carried on under the direction of Mr. W. T. Frary. Articles regarding the work of the Association, articles on Tuberculosis and general health subjects, camp pictures and other health news of interest to the general public have been sent to all papers in the County each week. Two radio talks have been given from WEEL. Seven talks have been given to clubs and organizations.

During the winter months articles on health subjects were sent to all of the industrial concerns in two of the larger towns. As the State Tuberculosis League is now doing this work we have discontinued this phase of adult health education.

On July 7, 1926, the Association entered a float in the Salem Tercentenary parade—the float represented a scene at camp showing the tents in the pine grove and some of the children busy with camp activities. Two children were also dressed in the costume of the Modern Health Crusaders.

At the Topsfield Fair in September, the Association had an exhibit of health posters, Crusade dolls, camp pictures and weight charts. Five hundred and thirty children were weighed and measured and given tags showing their normal weight. Literature on Tuberculosis and other preventable diseases was distributed.

In November and again in April, William Bartlett (known to the children as Bill Bartlett) visited the County and spoke to ten groups of school children—about 3,000 children in all. Mr. Bartlett is an ex-tuberculosis patient who is much interested in Preventive work among children and is active in forming Keep Well Clubs.

At the present time the Association is carrying on a Poster Contest in the schools of the County. These posters are to emphasize the positive side of health rather than the negative side. The judging of these posters will take place about the first of June.

In response to a request to the County Commissioners for funds the Association was granted \$2,000 for the erection of a new building to be used as a dining room and kitchen. This means that we shall be able to take sixty children this year and probably seventy to seventy-five next year.

CONCLUSION

This report cannot close without expressing our appreciation of all the generous cooperation we have received from the Sanatorium staff, from official and private organizations, from clubs, from the many individuals who have given so willingly of their time and efforts and the many thousands who have purchased the Christmas Seals. It is only through this cooperation that we have been able to carry on our program of educational and Preventive work which I have so inadequately described.

Respectfully submitted,

CORA L. COOKE, Field Secretary.

BOOK REVIEWS

The Harvey Lectures, Delivered Under the Auspices of the Harvey Society of New York, 1925-1926. By DRs. F. R. NAGER, JOHN H. NORTHROP, WARREN H. LEWIS, J. B. COLLIP, EDWIN B. WILSON, KNUD FABER, and B. BROUWER. Series XXI. Baltimore, The Williams & Wilkins Company, 1927. 229 pages.

The published lectures for 1925-26 consist of seven papers on a variety of topics. They may be briefly summarized as follows:

1. *On some recent otological problems.* Dr. F. R. Nager, of Zürich, lays stress on the importance of histological examinations of the ear. After pointing out the technical difficulties of fixation and cutting, he deals in some detail with suppurations, the early formation of cholesteatoma, oto-sclerosis, tuberculosis, and similar conditions. He believes that many practical results are likely to be evolved from oto-histological laboratory research work.

2. *The dynamics of pepsin and trypsin.* Northrop, of the Rockefeller Institute, has found that these enzymes do not differ in their reactions from other better-known chemical substances. The complex nature of the reactions are due to the fact that there are several simultaneous reactions, which may be separated from the main reaction. These enzymes, also, "distribute themselves in a system in which a Donnan equilibrium is set up in the same quantitative manner as do ordinary diffusible ions such as chloride or bromide." (p. 76.) The paper is illustrated by many charts and tables.

3. *The transformation of mononuclear blood cells into macrophages, epithelioid cells, and giant cells.* Lewis, of the Carnegie Institute of Washington, has examined the transformation of blood cells of many animals and man by the use of hanging drop blood culture. Hyper-trophied cells appeared in the cultures within a few days, which could be classified. Lewis believes that the enlarged forms are merely different phases of the same cell type or temporary functional variations. The cells were also studied by other methods. The theories of cell formation are critically discussed and important references to the literature are indicated.

4. *The parathyroid glands.* Collip's lecture covers sixty pages and is a complete survey of the subject. A review of this detailed presentation is not possible; those interested in the subject must read the original contribution. One word ought to be noted on the clinical aspect of Collip's extract. It has been used most successfully in case of hypoparathyroidism by the author and others. Calcium metabolism can be definitely influenced by the use of the parathyroid hormone combined with calcium therapy.

5. *Empiricism and rationalism.* The lecture is a discussion of the proper manner of treating

data from a statistical and mathematical viewpoint, by E. B. Wilson, professor of vital statistics, Harvard School of Public Health. He stresses the importance of mathematics and thinks that science is advanced along the path of "idealization, a recombination, sometimes a reversal, of scientific concepts, new experiments, and a little mathematics." (p. 178.)

6. *Historical outline of medical therapy.* Knud Faber, professor of medicine, University of Copenhagen, briefly expresses his views on nosography as related to therapy, based on an historical background.

7. *Comparative anatomy and neuropathology.* Brouwer, using his original researches on the cerebellum, the oculomotor nuclei and the posterior columns of the spinal cord, lays stress on the value of a knowledge of the exact relations of these parts in lower animals in order to understand the physiology and pathology of the human nervous system. He has long been a student at Kappers' Central Institute for Brain Research, Amsterdam, specializing on the phylogenetic development of the central nervous system.

Compressions of the Lung in the Treatment of Pulmonary Lesions. By STUART TIDEY, M.D. Humphrey Milford, Oxford University Press.

This is a short treatise, the greater part of which is in the nature of a philippic, in which the author wishes to prove that he was one of the first if not the first to introduce compressions of the lung as a therapeutic agent in tuberculosis. In the first part he records his early experiments along this line and in the second reviews the general principles on which the argument in support of compression of the lung is based. Nothing new on the subject is offered.

A Text-Book of Clinical Neurology. By ISRAEL S. WECHSLER, M.D. W. B. Saunders Company, Philadelphia and London, 1927. 725 pages.

A new American text-book on neurology would hardly appear necessary in view of the numerous books already in the field, some of them, even, in their second decade of editions. The general volumes on the subject are adequate and most of them have been kept well up to date. There is always a place, however, for a *personal* book, giving not only a digest of what is known of neurology, but, in addition, the author's teaching and clinical experiences, his "individual approach to bedside neurology." This is the type of book Wechsler has written. The work emanates from the Columbia University department of neurology, the Vanderbilt Clinic and the Mount Sinai and Montefiore Hospitals. The

field to be tilled for his crop is rich and the author has taken full advantage of the excellence of the soil.

He has omitted much of the usual historical material and case reports. A few important references to the literature are given at the end of each chapter. The text is brief, clear and adequate for the average student. The author is to be congratulated on the production of a good, useful book. The few illustrations are well chosen from personally observed cases.

X-Ray Diagnosis. By J. MAGNUS REDDING, F.R.C.S. William Wood & Company, New York.

As the author points out, in the preface, this book is an outline of the guiding principles of Radiographic Diagnosis. The descriptions of the various lesions are preceded by an analysis of the appearances produced by the normal structures and of the modification which results from disease.

The book contains 228 pages and is divided into 18 chapters, the first six, of which, are devoted to the osseous system. The chapter on The Appearance of Normal Bones and Joints; Their Ossification; Developmental and Abnormalities is perhaps the best in the book, although the other chapters on Diseases of the Bones and Joints are excellent. In his description of the appearance of the Thoracic and Abdominal Viscera the author does not always agree with the standards generally accepted in America. It is the opinion of the reviewer that this part of the text is better handled by American writers.

On the whole the author has given us an interesting and useful book.

Master Minds in Medicine: An analysis of Human Genius as the Instrument in the Evolution of Great Constructive Ideas in the History of Medicine, together with a System of Historic Methodology. By JOHN C. HEMMETTER, M.D., Ph.D., Sc.D., LL.D. Medical Life Press, New York, 1927. xxvii + 771 pages.

This large volume contains many of the author's contributions to medical history which have appeared in less permanent form in journals. To these have been added chapters on the technique of preparing historical essays and many related subjects. The best papers are those on "The United States Army Yellow Fever Commission" and Hemmeter's studies of Leonardo da Vinci and William Beaumont. Many of the "Master Minds" of medicine are omitted. The book is personal and sketchy and in no way resembles, as the title would suggest, a comprehensive treatise on the subject.